

User's Manual



CrossPoint™ 450 Plus Series

MAV Plus series

Large Scale Matrix Switchers

Precautions

Safety Instructions • English



This symbol is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.



This symbol is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.

Caution

Read Instructions • Read and understand all safety and operating instructions before using the equipment.

Retain Instructions • The safety instructions should be kept for future reference.

Follow Warnings • Follow all warnings and instructions marked on the equipment or in the user information.

Avoid Attachments • Do not use tools or attachments that are not recommended by the equipment manufacturer because they may be hazardous.

Consignes de Sécurité • Français



Ce symbole sert à avertir l'utilisateur que la documentation fournie avec le matériel contient des instructions importantes concernant l'exploitation et la maintenance (réparation).



Ce symbole sert à avertir l'utilisateur de la présence dans le boîtier de l'appareil de tensions dangereuses non isolées posant des risques d'électrocution.

Attention

Lire les instructions • Prendre connaissance de toutes les consignes de sécurité et d'exploitation avant d'utiliser le matériel.

Conservier les instructions • Ranger les consignes de sécurité afin de pouvoir les consulter à l'avenir.

Respecter les avertissements • Observer tous les avertissements et consignes marqués sur le matériel ou présentés dans la documentation utilisateur.

Eviter les pièces de fixation • Ne pas utiliser de pièces de fixation ni d'outils non recommandés par le fabricant du matériel car cela risquerait de poser certains dangers.

Sicherheitsanleitungen • Deutsch



Dieses Symbol soll dem Benutzer in der im Lieferumfang enthaltenen Dokumentation besonders wichtige Hinweise zur Bedienung und Wartung (Instandhaltung) geben.



Dieses Symbol soll den Benutzer darauf aufmerksam machen, daß im Inneren des Gehäuses dieses Produktes gefährliche Spannungen, die nicht isoliert sind und die einen elektrischen Schock verursachen können, herrschen.

Achtung

Lesen der Anleitungen • Bevor Sie das Gerät zum ersten Mal verwenden, sollten Sie alle Sicherheits- und Bedienungsanleitungen genau durchlesen und verstehen.

Aufbewahren der Anleitungen • Die Hinweise zur elektrischen Sicherheit des Produktes sollten Sie aufbewahren, damit Sie im Bedarfsfall darauf zurückgreifen können.

Befolgen der Warnhinweise • Befolgen Sie alle Warnhinweise und Anleitungen auf dem Gerät oder in der Benutzerdokumentation.

Keine Zusatzgeräte • Verwenden Sie keine Werkzeuge oder Zusatzgeräte, die nicht ausdrücklich vom Hersteller empfohlen wurden, da diese eine Gefahrenquelle darstellen können.

Instrucciones de seguridad • Español



Este símbolo se utiliza para advertir al usuario sobre instrucciones importantes de operación y mantenimiento (o cambio de partes) que se desean destacar en el contenido de la documentación suministrada con los equipos.



Este símbolo se utiliza para advertir al usuario sobre la presencia de elementos con voltaje peligroso sin protección aislante, que puedan encontrarse dentro de la caja o alojamiento del producto, y que puedan representar riesgo de electrocución.

Precaucion

Leer las instrucciones • Leer y analizar todas las instrucciones de operación y seguridad, antes de usar el equipo.

Conservar las instrucciones • Conservar las instrucciones de seguridad para futura consulta.

Obedecer las advertencias • Todas las advertencias e instrucciones marcadas en el equipo o en la documentación del usuario, deben ser obedecidas.

Evitar el uso de accesorios • No usar herramientas o accesorios que no sean específicamente recomendados por el fabricante, ya que podrían implicar riesgos.

安全须知 • 中文



这个符号提示用户该设备用户手册中有重要的操作和维护说明。



这个符号警告用户该设备机壳内有暴露的危险电压，有触电危险。

注意

阅读说明书 • 用户使用该设备前必须阅读并理解所有安全和使用说明。

保存说明书 • 用户应保存安全说明书以备将来使用。

遵守警告 • 用户应遵守产品和用户指南上的所有安全和操作说明。

避免追加 • 不要使用该产品厂商没有推荐的工具或追加设备，以避免危险。

Warning

Power sources • This equipment should be operated only from the power source indicated on the product. This equipment is intended to be used with a main power system with a grounded (neutral) conductor. The third (grounding) pin is a safety feature, do not attempt to bypass or disable it.

Power disconnection • To remove power from the equipment safely, remove all power cords from the rear of the equipment, or the desktop power module (if detachable), or from the power source receptacle (wall plug).

Power cord protection • Power cords should be routed so that they are not likely to be stepped on or pinched by items placed upon or against them.

Servicing • Refer all servicing to qualified service personnel. There are no user-serviceable parts inside. To prevent the risk of shock, do not attempt to service this equipment yourself because opening or removing covers may expose you to dangerous voltage or other hazards.

Slots and openings • If the equipment has slots or holes in the enclosure, these are provided to prevent overheating of sensitive components inside. These openings must never be blocked by other objects.

Lithium battery • There is a danger of explosion if battery is incorrectly replaced. Replace it only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Avertissement

Alimentations • Ne faire fonctionner ce matériel qu'avec la source d'alimentation indiquée sur l'appareil. Ce matériel doit être utilisé avec une alimentation principale comportant un fil de terre (neutre). Le troisième contact (de mise à la terre) constitue un dispositif de sécurité : n'essayez pas de la contourner ni de la désactiver.

Déconnexion de l'alimentation • Pour mettre le matériel hors tension sans danger, déconnectez tous les cordons d'alimentation de l'arrière de l'appareil ou du module d'alimentation de bureau (s'il est amovible) ou encore de la prise secteur.

Protection du cordon d'alimentation • Acheminer les cordons d'alimentation de manière à ce que personne ne risque de marcher dessus et à ce qu'ils ne soient pas écrasés ou pincés par des objets.

Réparation-maintenance • Faire exécuter toutes les interventions de réparation-maintenance par un technicien qualifié. Aucun des éléments internes ne peut être réparé par l'utilisateur. Afin d'éviter tout danger d'électrocution, l'utilisateur ne doit pas essayer de procéder lui-même à ces opérations car l'ouverture ou le retrait des couvercles risquent de l'exposer à de hautes tensions et autres dangers.

Fentes et orifices • Si le boîtier de l'appareil comporte des fentes ou des orifices, ceux-ci servent à empêcher les composants internes sensibles de surchauffer. Ces ouvertures ne doivent jamais être bloquées par des objets.

Lithium Batterie • Il a danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un ype équivalent recommandé par le constructeur. Mettre au reut les batteries usagées conformément aux instructions du fabricant.

Vorsicht

Stromquellen • Dieses Gerät sollte nur über die auf dem Produkt angegebene Stromquelle betrieben werden.

Dieses Gerät wurde für eine Verwendung mit einer Hauptstromleitung mit einem geerdeten (neutralen) Leiter konzipiert. Der dritte Kontakt ist für einen Erdschluß, und stellt eine Sicherheitsfunktion dar. Diese sollte nicht umgangen oder außer Betrieb gesetzt werden.

Stromunterbrechung • Um das Gerät auf sichere Weise vom Netz zu trennen, sollten Sie alle Netzkabel aus der Rückseite des Gerätes, aus der externen Stromversorgung (falls dies möglich ist) oder aus der Wandsteckdose ziehen.

Schutz des Netzkabels • Netzkabel sollten stets so verlegt werden, daß sie nicht im Weg liegen und niemand darauf treten kann oder Objekte darauf- oder unmittelbar dagegengestellt werden können.

Wartung • Alle Wartungsmaßnahmen sollten nur von qualifiziertem Servicepersonal durchgeführt werden. Die internen Komponenten des Gerätes sind wartungsfrei. Zur Vermeidung eines elektrischen Schocks versuchen Sie in keinem Fall, dieses Gerät selbst öffnen, da beim Entfernen der Abdeckungen die Gefahr eines elektrischen Schlags und/oder andere Gefahren bestehen.

Schlitze und Öffnungen • Wenn das Gerät Schlitze oder Löcher im Gehäuse aufweist, dienen diese zur Vermeidung einer Überhitzung der empfindlichen Teile im Inneren. Diese Öffnungen dürfen niemals von anderen Objekten blockiert werden.

Litium-Batterie • Explosionsgefahr, falls die Batterie nicht richtig ersetzt wird. Ersetzen Sie verbrauchte Batterien nur durch den gleichen oder einen vergleichbaren Batterietyp, der auch vom Hersteller empfohlen wird. Entsorgen Sie verbrauchte Batterien bitte gemäß den Herstelleranweisungen.

Advertencia

Alimentación eléctrica • Este equipo debe conectarse únicamente a la fuente/tipo de alimentación eléctrica indicada en el mismo. La alimentación eléctrica de este equipo debe provenir de un sistema de distribución general con conductor neutro a tierra. La tercera pata (puesta a tierra) es una medida de seguridad, no puentearia ni eliminaria.

Desconexión de alimentación eléctrica • Para desconectar con seguridad la acometida de alimentación eléctrica al equipo, desenchufar todos los cables de alimentación en el panel trasero del equipo, o desenchufar el módulo de alimentación (si fuera independiente), o desenchufar el cable del receptáculo de la pared.

Protección del cables de alimentación • Los cables de alimentación eléctrica se deben instalar en lugares donde no sean pisados ni apretados por objetos que se puedan apoyar sobre ellos.

Reparaciones/mantenimiento • Solicitar siempre los servicios técnicos de personal calificado. En el interior no hay partes a las que el usuario deba acceder. Para evitar riesgo de electrocución, no intentar personalmente la reparación/mantenimiento de este equipo, ya que al abrir o extraer las tapas puede quedar expuesto a voltajes peligrosos u otros riesgos.

Ranuras y aberturas • Si el equipo posee ranuras o orificios en su caja/alojamiento, es para evitar el sobrecalentamiento de componentes internos sensibles. Estas aberturas nunca se deben obstruir con otros objetos.

Batería de litio • Existe riesgo de explosión si esta batería se coloca en la posición incorrecta. Cambiar esta batería únicamente con el mismo tipo (o su equivalente) recomendado por el fabricante. Desachar las baterías usadas siguiendo las instrucciones del fabricante.

警告

电源 • 该设备只能使用产品上标明的电源。设备必须使用有地线的供电系统供电。第三条线（地线）是安全设施，不能不用或跳过。

拔掉电源 • 为安全地从设备拔掉电源，请拔掉所有设备后或桌面电源的电源线，或任何接到市电系统的电源线。

电源线保护 • 妥善布线，避免被踩踏，或重物挤压。

维护 • 所有维修必须由认证的维修人员进行。设备内部没有用户可以更换的零件。为避免出现触电危险不要自己试图打开设备盖子维修该设备。

通风孔 • 有些设备机壳上有通风槽或孔，它们是用来防止机内敏感元件过热。不要用任何东西挡住通风孔。

锂电池 • 不正确的更换电池会有爆炸的危险。必须使用与厂家推荐的相同或相近型号的电池。按照生产厂的建议处理废弃电池。

FCC Class A Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. The Class A limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

NOTE *This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to ensure compliance with FCC emissions limits.*

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CrossPoint 450 Plus and MAV Plus Switchers

1 Chapter One

Introduction

About this Manual

About the Matrix Switchers

Features

Introduction

About this Manual

This manual contains installation, configuration, and operating information for the Extron family of full-function, very large CrossPoint™ 450 Plus ultra-wideband and MAV Plus 3248 through 6464 video and audio matrix switchers.

About the Matrix Switchers

Matrix switchers distribute any input to any combination of outputs. The matrix switchers can route multiple input/output configurations simultaneously.

The Extron very large CrossPoint 450 Plus and MAV Plus matrix switchers are a family of matrix switcher basic module enclosures (BMEs) that allow you to create a video, audio, or video and audio matrix switching system with up to 64 inputs and 64 outputs specifically tailored to meet your requirements. All BMEs are rack mountable. All video and sync BMEs are 6U in height; audio BMEs are 7U in height. This family of matrix switcher BMEs includes the following models:

- **CrossPoint 450 Plus wideband video switcher BME** — A switcher that routes one video plane (red [R], green [G], and blue [B]) from any input to any one or more outputs. This BME has a video bandwidth of 450 MHz (–3 dB), fully loaded, to support video resolutions of 1600 x 1200 and above.
- **CrossPoint 450 Plus sync switcher BME** — A switcher that routes one sync plane (horizontal [H], vertical [V], or composite sync [S]) from any input to any one or more outputs
- **MAV Plus video switcher BME** — A switcher that routes one plane of low resolution (NTSC/PAL/SECAM) component video (Y, R-Y, or B-Y), S-video (Y or C), and composite video from any input to any one or more outputs. This BME has a video bandwidth of 150 MHz (–3 dB), fully loaded, to support all video resolutions.
- **MAV Plus stereo audio switcher BME** — A switcher that routes balanced or unbalanced stereo audio (two audio planes) from any input to any one or more outputs
- **MAV Plus mono audio switcher BME** — A switcher that routes mono audio (one audio plane) from any input to any one or more outputs

Each BME model is available in the following matrix sizes:

- 3248 (32 inputs by 48 outputs)
- 3264 (32 inputs by 64 outputs)
- 4832 (48 inputs by 32 outputs)
- 4848 (48 inputs by 48 outputs)
- 4864 (48 inputs by 64 outputs)
- 6432 (64 inputs by 32 outputs)
- 6448 (64 inputs by 48 outputs)
- 6464 (64 inputs by 64 outputs)

Some BMEs are equipped with integrated QuickSwitch-Front Panel Controllers (QS-FPC™):

- The CrossPoint 450 Plus video BME is available **with or without** a QS-FPC.
- The MAV Plus video BME is **always** equipped with a QS-FPC.
- The CrossPoint 450 Plus sync BME is **not available** with a QS-FPC.
- The MAV Plus audio BME (stereo or mono) is **not available** with a QS-FPC.
- BMEs without a QS-FPC are equipped with blank front panels.

A wideband (RGBHV or RGBS) video matrix switcher system requires a CrossPoint 450 Plus wideband BME for each video plane (red, green, and blue) and a CrossPoint 450 Plus sync BME for each sync plane (H and V [two planes] or composite sync [one plane]). To add audio to the system requires a MAV Plus stereo or mono audio BME (figure 1-1).

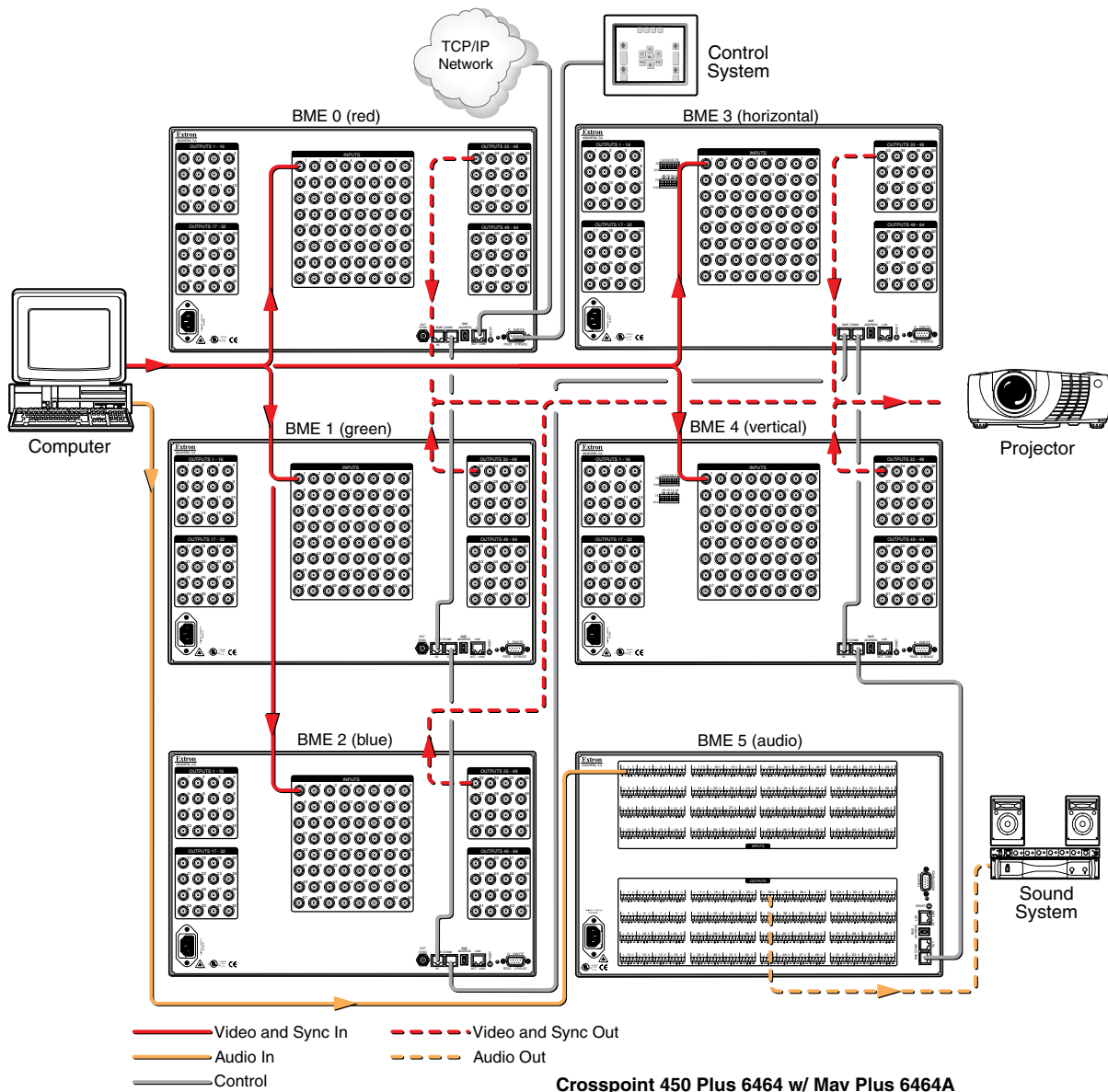


Figure 1-1 — CrossPoint 450 Plus / MAV Plus application

Introduction, cont'd

A low resolution video matrix switcher system requires a MAV Plus video BME for each video plane (three BMEs for component video, two BMEs for S-video, or one BME for composite video). To add audio to the system requires a MAV Plus stereo or mono audio BME.

NOTE *Multiple QS-FPCs are unnecessary and potentially confusing. To avoid confusion, Extron recommends that you lock the redundant QS-FPCs. See "Setting the front panel locks (Executive modes)" on page 3-43.*

The matrix switchers are solutions to complex wideband or low resolution video and audio routing applications. Each input and output is individually isolated and buffered, and any input(s) can be switched to any one or all outputs with virtually no crosstalk or signal noise between channels.

The audio BMEs input and output audio on 3.5 mm, 5-pole (stereo BME) or 3-pole (mono BME) captive screw terminals.

For matrix switcher systems with video and audio BMEs, the audio switching can be either linked with the video (audio follow) or independent of the video (audio breakaway). Adjustable input audio gain and attenuation compensates for level differences between audio inputs.

The matrix switcher system can be remotely controlled via any of the following ports on the primary BME (BME 0):

- Rear panel Local Area Network (LAN) Ethernet port
- Rear panel Remote RS-232/RS-422 port
- Front panel Configuration (RS-232) port

The matrix switchers are programmed with the Extron Simple Instruction Set (SIS™), a set of basic ASCII code commands that provide simple control through a control system or PC without a need to program long, obscure strings of code. SIS commands can be entered via the LAN port or either serial port.

The LAN port can be connected through a LAN or wide area network (WAN).

The switchers feature e-mail notification of maintenance or other interested personnel about the status of the power supplies and the loss or resumption of sync on individual inputs.

The Remote RS-232/RS-422 port and the Configuration port can be connected to a control system, a PC, or any of the Extron remote control panels, such as the MKP 2000 or MKP 3000.

The matrix switchers are housed in rack-mountable, metal enclosures with 19-inch rack ears. Each video and sync BME model is a 6U enclosure. The MAV Plus audio BMEs are 7U enclosures. The appropriate rack mounting kit is included with each switcher.

Each model has two, primary and redundant, internal 100 VAC to 240 VAC, 50/60 Hz power supplies that provide worldwide power compatibility and redundant dependability. The power supply wattages are as follows:

- **195 watts** — All MAV Plus audio BMEs
- **110 watts** — CrossPoint 450 Plus 64-input and 48-input video BMEs and all MAV Plus video BMEs
- **65 watts** — All CrossPoint 450 Plus sync BMEs
- **50 watts** — CrossPoint 450 Plus 32-input BMEs

Features

Video (video BMEs) — All switchers input and output video on BNC connectors.

- **CrossPoint 450 Plus wideband video** — These switcher BMEs input and output wideband RGBHV or RGBS video. They can also switch RGsB, RsGsBs, component/HDTV, S-video, or composite video.
- **MAV Plus low resolution video** — These switcher BMEs input and output NTSC 3.58, NTSC 4.43, PAL, or SECAM video or HDTV video inputs. Depending on the video format of the switcher system, these switchers can distribute low resolution RGsB, RsGsBs, component/HDTV, S-video, or composite video.

Bandwidth —

- **CrossPoint 450 Plus wideband video** — The wideband switcher BMEs provide a minimum of 450 MHz (-3 dB) video bandwidth, fully loaded.
- **MAV Plus low resolution video** — The low resolution switcher BMEs provide a minimum of 150 MHz (-3 dB) video bandwidth, fully loaded.

Audio inputs (audio BMEs only) —

- **Stereo audio BMEs** — Input and output balanced or unbalanced stereo audio on 3.5 mm, 5-pole captive screw terminals.
- **Mono audio BMEs** — Input and output mono audio on 3.5 mm, 3-pole captive screw terminals.

Audio input gain/attenuation (audio BMEs only) — Individual input audio levels can be adjusted so there are no noticeable volume differences between sources. Users can set the input level of audio gain or attenuation (-18 dB to +24 dB) via the LAN port, either serial port, or the front panel.

Audio output volume (systems with audio BMEs) — The audio volume of each output can be displayed and adjusted through a range of full volume to completely silent, from the front panel or under serial or Ethernet port control.

Introduction, cont'd

Digital Sync Validation Processing (DSVP™) (CrossPoint 450 Plus sync BMEs) —

In critical environments or unmanned remote locations, it may be vital to know that sources are active and switching. The DSVP feature confirms that input sources are active by scanning all sync inputs for active signals. DSVP provides instantaneous frequency feedback for composite sync or separate horizontal and vertical sync signals via the switcher's serial ports or LAN port. The frequency information can be displayed on any control system or in a Windows®-based control program on a local-area network (LAN) or Internet (IP) connection (figure 1-2).

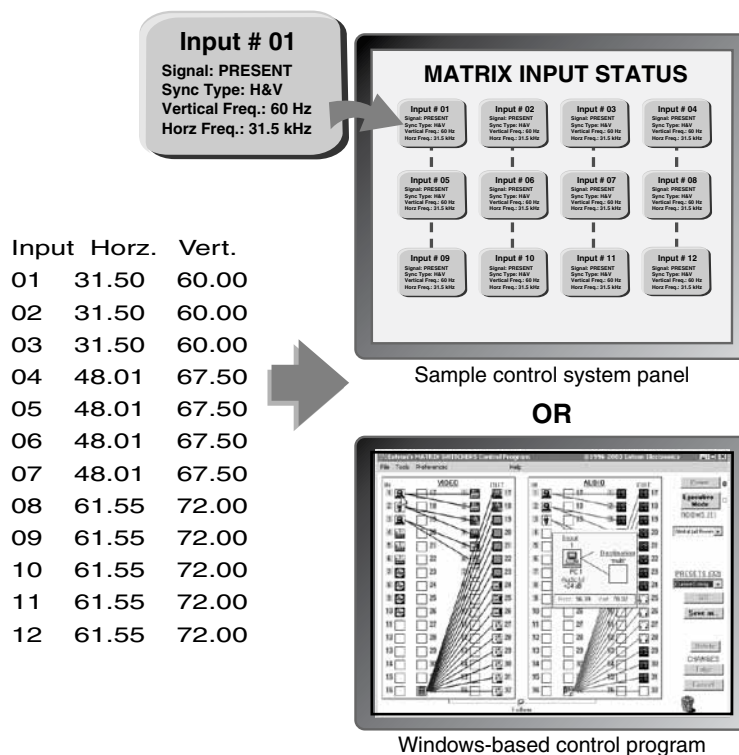


Figure 1-2 — DSVP data display

RGB Delay (CrossPoint 450 Plus sync BMEs) — A switcher that includes a CrossPoint 450 Plus sync BME can briefly blank the RGB (video) output while it switches to the new input's sync source, and then switches the RGB signals. This allows a brief delay for the display to adjust to the selected input's sync timing before displaying the new picture, which appears without glitches. RGB delay, also known as Triple-Action Switching™ or video mute switching, is user selectable from 0 to 5 seconds, in half-second increments.

Rooming — Each switcher can be programmed to group multiple outputs to specific "rooms", allowing each room to have its own presets.

Switching flexibility — Provides individually buffered, independent matrix switched outputs with audio follow and audio breakaway for systems with audio BMEs.

- **Tie any input to any or all outputs**
- **Quick multiple tie** — Multiple inputs can be switched to multiple outputs simultaneously. This allows all displays (outputs) to change from source to source at the same time.
- **Audio follow** — Audio can be switched with its corresponding video input via front panel control or under Ethernet or serial port remote control.
- **Audio breakaway** — Audio can be broken away from its corresponding video signal. This feature allows any audio signal to be selected with any video signal simultaneously to one or all outputs in any combination. Audio breakaway switching can be done via front panel control or under Ethernet or serial port remote control.

Operational flexibility — Operations such as input/output selection, setting of presets, and adjustment of audio levels can be performed on the front panel or via the Ethernet port or either serial port. The Ethernet and serial ports allow remote control via a PC or control system. The LAN port allows multiple remote links with two levels of password protection.

- **QuickSwitch-Front Panel Controller (QS-FPC)** — The optional front panel controller supports input and output selection, I/O grouping, preset creation and selection, RGB delay, audio gain and attenuation, and volume control (systems with audio BMEs). The front panel features illuminated pushbuttons that can be labeled with text or graphics.

NOTE *The front panel controller is standard, not optional, on MAV Plus video BMEs. In systems with multiple BMEs, all are operational, but there may be a delay in reporting configuration. To prevent confusion, Extron recommend locking the front panels of all BMEs with the exception of BME 0.*

A front panel controller cannot be installed on a sync or audio BME. See "Setting the front panel locks (Executive modes)" on page 3-43.

- **Windows-based control program** — For serial or Ethernet port remote control from a PC, the Extron Windows-based control software provides a graphical interface and drag-and-drop, point-and-click operation. The Windows-based control program also has an emulation mode that lets you create a switcher configuration file at the home office and then download it for use by the switcher on site.
- **Simple Instruction Set (SIS)** — The remote control protocol uses the Extron SIS for easy programming and operation.
- **Remote control panels and keypads** — The matrix switchers are remote controllable, using the optional MKP 2000 and MKP 3000 remote control panels. The remote control devices are easy to use and provide tactile buttons for quick selection. Each MKP can be used for input-to-output switching or one-touch switching for a particular output. The MKP 3000 also can be used for selection of global presets.

Upgradeable firmware — The firmware that controls all switcher operation can be upgraded in the field via either serial port or the Ethernet port, without the switcher being taken out of service. Firmware upgrades are available for download on the Extron Web site, www.extron.com, and they can be installed using the Windows-based control program or the built-in HTML pages.

Introduction, cont'd

Labeling — The included Extron Button Label Generator software lets you create labels to place in the front panel I/O buttons, with names, alphanumeric characters, or color bitmaps for easy and intuitive input and output selection. Alternatively, labels can be made with any Brother™ P-Touch™ or comparable labeler.

Global memory presets — 64 global memory presets are a time-saving feature that lets you set up and store input/output configurations in advance. You can then recall those configurations, when needed, with a few simple steps.

Rack mounting — Rack mountable in any conventional 19-inch wide rack

Front panel security lockout (*Executive mode*) — If a matrix switcher BME with a QS-FPC is installed in an open area where operation by unauthorized personnel may be a problem, a security lockout feature can be implemented. When the front panel is locked, a special button combination or SIS command is required to unlock the front panel controller before it can be operated.

I/O grouping — Allows the matrix to be virtually divided into smaller sub-switchers, making installation and control easier. I/O grouping allows specific inputs and outputs, such as those designated for a specific purpose, to be grouped together. I/O grouping limits the selection of inputs and outputs to members of the same group.

Primary and redundant power supplies — Includes two internal 100 VAC to 240 VAC, 50-60 Hz power supplies that provide worldwide power compatibility.

The power supply circuitry is configured to automatically switch over from the primary supply to the hot redundant supply in the case of a failure.

The hot redundant power supply means high reliability for the system and no loss of functionality should the primary supply fail; the redundant power supply immediately assumes the load.

Power supply status LEDs — Front panel LEDs indicate the status of the primary and redundant power supplies.



CrossPoint 450 Plus and MAV Plus Switchers

Chapter Two

Installation

Setup and Installation Checklist

Mounting the Switcher

Rear Panel Cabling and Features

Front Panel Configuration Port

Installation

Setup and Installation Checklist

Get ready

- ☐ Familiarize yourself with the CrossPoint 450 Plus and MAV Plus matrix switcher BMEs.
- ☐ Obtain IP setting information for the matrix switcher from the local network administrator. Read appendix A, "Ethernet Connection".

Perform physical installation

- ☐ If desired, create button labels (page 5-25) and replace them (page B-14).
- ☐ If desired, install the switcher BMEs in a rack (below).
- ☐ Set the BME addresses.
- ☐ Connect the BME COMM interconnecting cables.
- ☐ Cable input and output devices to the I/O ports (page 2-4).
- ☐ If desired, connect the serial cable(s) to BME 0's Remote RS-232/RS-422 port (page 2-9) or front panel Configuration port (page 2-13) and to the PC or control system.
- ☐ If desired, connect an RJ-45 cable between BME 0's LAN port and to a PC or control system (page 2-10).
- ☐ If desired, set the sync termination switches (page 2-5).
- ☐ Connect the AC power cables to all BMEs (page 2-12). Apply AC power to the BMEs and verify the BMEs power up normally.
- ☐ Test the switcher by creating a tie (page 3-14).

Ancillary operations

- ☐ Install the Windows-based control program (page 5-2).

Mounting the Switcher

UL guidelines

The following Underwriters Laboratories (UL) guidelines pertain to the installation of the matrix switcher BME into a rack.

1. **Elevated operating ambient temperature** — If the equipment installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, install the matrix switcher in an environment compatible with the maximum ambient temperature (TMA = 158 °F, +70 °C) specified by Extron.
2. **Reduced air flow** — Install the equipment in a rack so that the amount of air flow required for safe operation of the equipment is not compromised.
3. **Mechanical loading** — Mount the equipment in the rack so that a hazardous condition is not achieved due to uneven mechanical loading.
4. **Circuit overloading** — Connect the equipment to the supply circuit and consider the effect that circuit overloading might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
5. **Reliable earthing (grounding)** — Maintain reliable grounding of rack-mounted equipment. Pay particular attention to supply connections other than direct connections to the branch circuit (for example, use of power strips).

Mounting instructions

The matrix switcher BMEs are rack-mountable, 6U (sync and video BMEs) or 7U (audio BMEs) high metal enclosures with 19-inch rack ears. If desired, rack mount the switcher BME as follows:

1. Insert the switcher BME into the rack, aligning the holes in the mounting bracket with those in the rack.
2. Secure the switcher BME to the rack using the supplied bolts.

Rear Panel Cabling and Features

All connectors for all switcher BMEs are on the rear panel. Figure 2-1 shows a CrossPoint 450 Plus 6464 Sync BME, which has a feature set similar to all of the features of all of the video and sync switcher BMEs with the following exceptions:

- The Sync Termination DIP switches (③) are found on the sync BME *only*.
- The External Sync BNC connection (⑪) is found on the MAV Plus and CrossPoint 450 Plus video BMEs *only*.

Figure 2-2 shows a MAV Plus 6464 stereo audio BME.

CAUTION Use electrostatic discharge precautions (be electrically grounded) when making connections. Electrostatic discharge (ESD) can damage equipment, even if you cannot feel, see, or hear it.

CAUTION Remove system power before making all connections.

NOTE The 3248, 3264, 4832, 4848, 4864, 6432, 6448 matrix sizes are housed in the same size enclosure, but have fewer input and output connectors to accommodate their smaller matrix sizes.

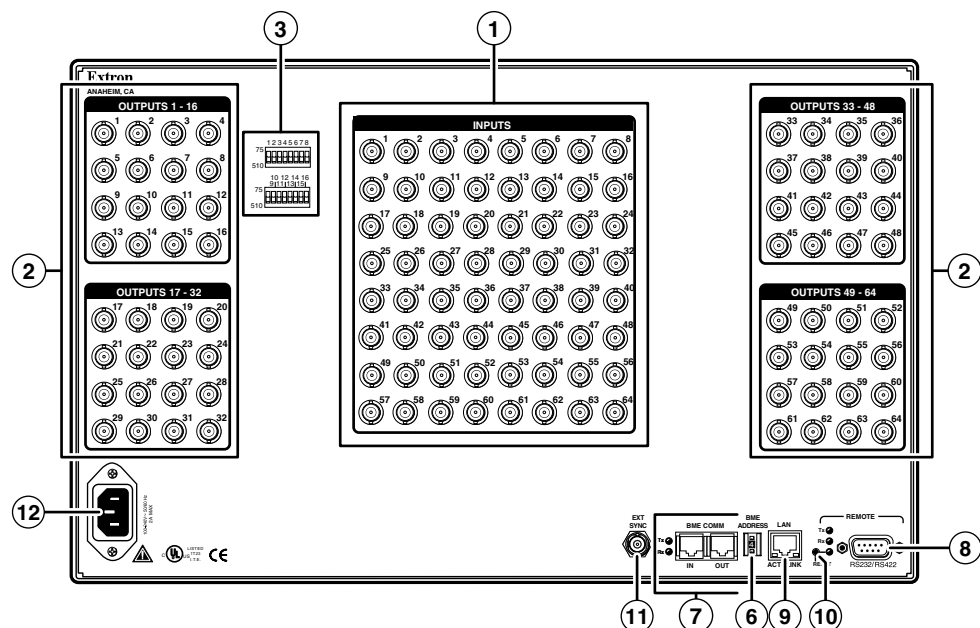


Figure 2-1 — CrossPoint 450 Plus / MAV Plus 6464 sync or video matrix switcher BME

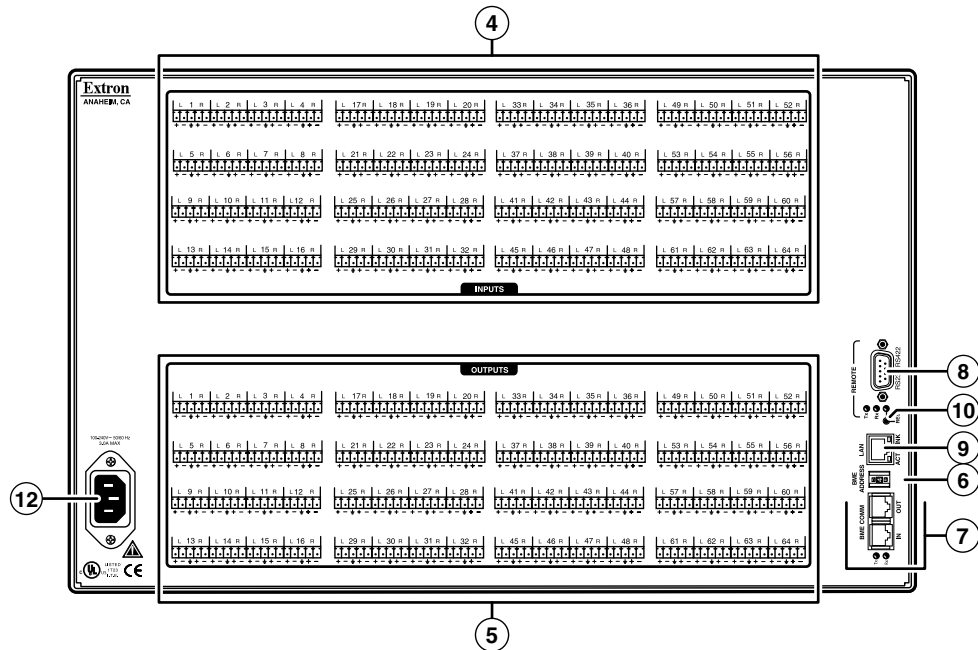


Figure 2-2 — MAV Plus 6464 Stereo Audio BME

Video or sync input and output (video and sync BMEs)

NOTE The switchers do not alter the input video or sync signal in any way. The signal output by the BME is in the same format as the input.

The switcher can connect to as many as 64 video sources and output to as many as 64 video devices, depending on the model.

NOTE Each video plane (such as red, green, or blue) or sync plane (such as horizontal sync or vertical sync) requires its own BME of the appropriate type:

Red, green, and blue video planes — Connect these planes to **CrossPoint 450 Plus wideband video BMEs**.

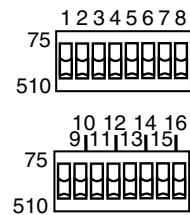
Horizontal sync, vertical sync, and composite sync — Connect these planes to **CrossPoint 450 Plus sync BMEs**.

Y, R-Y, B-Y [component video], Y, C [S-video], or video [composite video] — Connect these planes to **MAV Plus low resolution video BMEs**.

- ① **Video or sync inputs** — Connect a single plane of video or sync, as appropriate to the BME type, to these BNC connectors for each input.
- ② **Video or sync outputs** — Connect a single plane of video or sync, as appropriate to the BME type, to these BNC connectors for each output.

Sync termination switches (systems with sync BMEs)

- ③ **Sync termination switches** — The CrossPoint 450 Plus sync matrix switcher BMEs have sync termination switches on the rear panel for inputs 1 through 16. The switches provide a way to condition non-TTL sync levels greater than 5 Vp-p, enabling the sync to be properly passed from input to selected output(s).



Each switch provides the option of selecting either 510 ohms or 75 ohms. The 75 ohms position is required only for an input with non-TTL sync, greater than 5 V p-p. The normal position is 510 ohms.

NOTE *An input that produces an out of sync display (a display that is rolling vertically, tearing horizontally, or both) could indicate a non-TTL sync input. A device that is known to output non-TTL sync levels (greater than 5 V p-p) should be connected to one of the inputs with sync termination switches, and the switches for that input should be set to the 75 ohm position. If you are not sure, check the specifications in the user's manual for the input device.*

Audio input and output (systems with audio BMEs)

NOTE *Figure 2-2 shows a MAV Plus 6464 stereo audio BME. The mono audio BME looks similar, but has 3-pole captive screw connectors rather than the 5-pole connectors shown.*

By default, the audio ties follow the video ties. Audio breakaway, which can be activated via the optional front panel or under Ethernet or RS-232/RS-422 control, allows you to select from any one of the audio input sources and route it separately from its corresponding video source. See chapter 3, "Operation", chapter 4, "Programmer's Guide", chapter 5, "Matrix Software", and chapter 6, "HTML Operation", for details.

- ④ **Connections for balanced and unbalanced audio inputs** — Each input has a 3.5 mm, 5-pole (stereo audio BME) or 3-pole (mono audio BME) captive screw connector for balanced or unbalanced stereo or mono audio input (depending on the BME). Connectors are included with each switcher, but you must supply the audio cable.

See figure 2-3 to wire a connector on a stereo audio BME for the appropriate input type and impedance level.

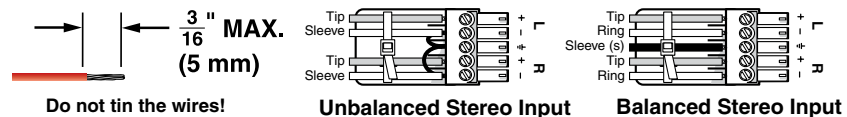


Figure 2-3 — Captive screw connector wiring for stereo audio inputs

See figure 2-4 to wire a connector on a mono audio BME.

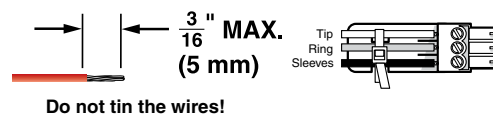


Figure 2-4 — Captive screw connector wiring for mono audio inputs

Installation, cont'd

CAUTION The captive screw audio connector can easily be inadvertently plugged partially into one receptacle and partially into an adjacent receptacle. This misconnection could damage the audio circuits. Ensure that the connector is plugged fully and only into the desired input or output.

NOTE The length of exposed wires is critical. The ideal length is 3/16 inch (5 mm).

- If the stripped section of wire is longer than 3/16 inch, the exposed wires may touch, causing a short circuit between them.
- If the stripped section of wire is shorter than 3/16 inch, wires can be easily pulled out even if tightly fastened by the captive screws.

NOTE See figure 2-5 to identify the tip, ring, and sleeve when you are making connections for the switcher from existing audio cables. A mono audio connector consists of the tip and sleeve. A stereo audio connector consists of the tip, ring and sleeve. The ring, tip, and sleeve wires are also shown on the captive screw audio connector diagrams: figure 2-3, figure 2-4, figure 2-6, and figure 2-7.

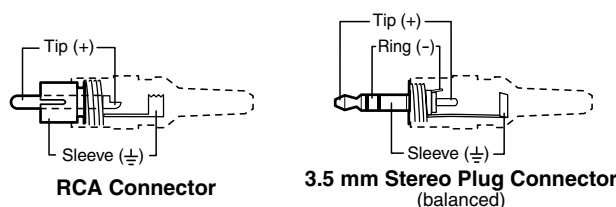


Figure 2-5 — Typical audio connectors

The audio level for each input can be individually set via the front panel or via Ethernet or RS-232/RS-422 control to ensure that the level on the output does not vary from input to input. See chapter 3, "Operation", chapter 4, "Programmer's Guide", chapter 5, "Matrix Software", and chapter 6, "HTML Operation" for details.

- ⑤ **Connections for balanced and unbalanced audio outputs** — These 3.5 mm, 5-pole (stereo audio BMEs) or 3-pole (mono audio BMEs) captive screw connectors output the selected unamplified, line level audio. Connect audio devices, such as an audio amplifier or powered speakers.

See figure 2-6 to properly wire an output connector for the stereo audio BME.

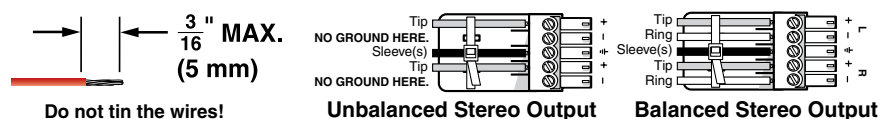


Figure 2-6 — Captive screw connector wiring for stereo audio outputs

CAUTION For unbalanced audio, connect the sleeve(s) to the ground contact. **DO NOT** connect the sleeve(s) to the negative (-) contacts).

See figure 2-7 to properly wire an output connector for the mono audio BME.

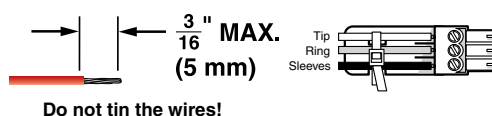


Figure 2-7 — Captive screw connector wiring for mono audio outputs

NOTE The length of exposed wires is critical. The ideal length is 3/16 inch (5 mm).

- If the stripped section of wire is longer than 3/16 inch, the exposed wires may touch, causing a short circuit between them.
- If the stripped section of wire is shorter than 3/16 inch, wires can be easily pulled out even if tightly fastened by the captive screws.

The volume level for each output can be individually set via the front panel or via Ethernet or RS-232/RS-422 control. See chapter 3, "Operation", chapter 4, "Programmer's Guide", chapter 5, "Matrix Software", and chapter 6, "HTML Operation" for details.

BME connection and selection

NOTE BME 0 should house the front panel controller and be the BME used for system control and monitoring via the serial ports and Ethernet LAN link.

- ⑥ **BME address switch** — To set the BME address, press the + and - buttons on the BME Address switch on the rear panel of the switcher (figure 2-8).
- Each BME must be set to a unique address of 0 through 5.
 - Addresses 6 through 9 are invalid.
 - The addresses used in the system must be sequential with no skipped numbers.
 - Sync BMEs cannot be set to address 0.

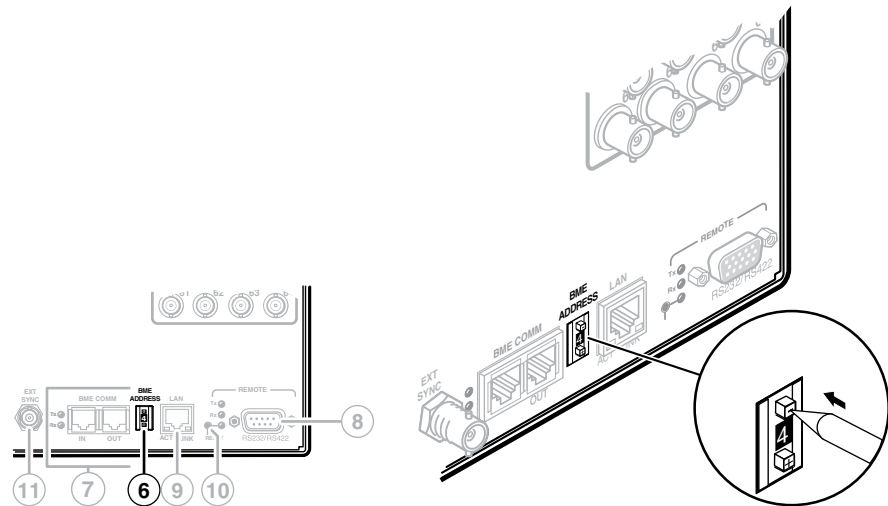


Figure 2-8 — Setting a BME address (video BME shown)

Installation, cont'd

- ⑦ **BME COMM interconnect ports** — If the matrix switcher system consists of more than one BME, the BMEs must be connected together in a daisy chain using Extron-supplied RJ-45 cables.
- Connect the first daisy chain from BME 0's BME Comm Out connector to the nearest BME's BME Comm In connector (figure 2-9). In a rack where BMEs are arranged so that their physical location matches the BME address numbering, this would be BME 1. But since not all systems are configured alike, call this module BME n .

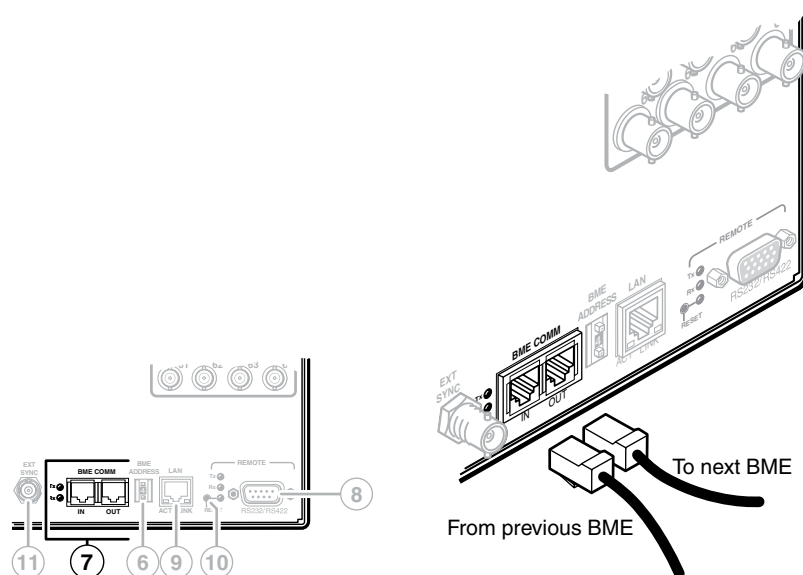


Figure 2-9 — Daisy-chaining BMEs (video BME shown)

- Connect the next RJ-45 cable from BME n 's BME Comm Out connector to the nearest unconnected BME's (BME $n+1$'s) BME Comm In connector.
- Continue connecting RJ-45 cables from each daisy-chained module's BME Comm Out connector to the next module's BME Comm In connector until all modules are included in the chain. When all of the BMEs are connected, each of the BMEs in the system is connected to at least one other BME via the BME Comm connectors.

RS-232/RS-422

- ⑧ **Remote RS-232/RS-422 connector** — Connect a host device, such as a computer, touch panel control, or RS-232 capable PDA to the switcher via this 9-pin D connector **on BME 0 only** for serial RS-232/RS-422 control (figure 2-10).

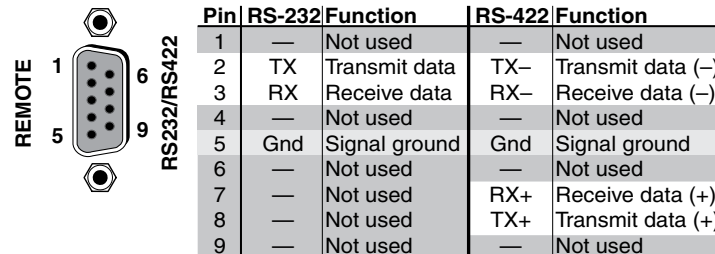


Figure 2-10 — Remote RS-232/RS-422 connector

See chapter 4, "Programmer's Guide", for definitions of the SIS commands (serial commands to control the switcher via this connector) and chapter 5, "Matrix Software" for details on how to install and use the control software.

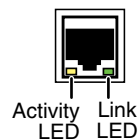
NOTE *The switcher can support either the RS-232 or RS-422 serial communication protocol, and operate at 9600, 19200, 38400, or 115200 baud rates. See "Selecting the rear panel Remote port protocol and baud rate" in chapter 3, "Operation", to configure the RS-232/RS-422 port from the front panel.*

If desired, connect an MKP 2000 or MKP 3000 remote control panel to BME 0's Remote RS-232/RS-422 connector. Refer to the *MKP 2000 Remote Control Panel User's Manual* or the *MKP 3000 Remote Control Panel User's Manual* for details.

Installation, cont'd

Ethernet

- ⑨ **Ethernet port** — If desired, for IP control of the system, connect the matrix switcher to a PC or to an Ethernet LAN via this RJ-45 connector **on BME 0 only**. You can use a PC to control the networked switcher with SIS commands from anywhere in the world. You can also control the switcher from a PC that either is running the Extron Windows-based control program or that has downloaded HTML pages from the switcher.



Ethernet connection indicators — The Link and Act LEDs indicate the status of the Ethernet connection. The Link LED indicates that the switcher is properly connected to an Ethernet LAN. This LED should light steadily. The Act LED indicates transmission of data packets on the RJ-45 connector. This LED should flicker as the switcher communicates.

Cabling and RJ-45 connector wiring

It is vital that your Ethernet cables be the correct cables, and that they be properly terminated with the correct pinout. Fast Ethernet links use Category (CAT) 5e or CAT 6, unshielded twisted pair (UTP) or shielded twisted pair (STP) cables, terminated with RJ-45 connectors. Ethernet cables are limited to a length 328 feet (100 m).

NOTE *Do not use standard telephone cables. Telephone cables do not support Ethernet or Fast Ethernet.*

Do not stretch or bend cables. Transmission errors can occur.

The cable used depends on your network speed. The switcher supports both 10 Mbps (10Base-T — Ethernet) and 100 Mbps (100Base-T — Fast Ethernet), half-duplex and full-duplex Ethernet connections.

- 10Base-T Ethernet requires CAT 3 UTP or STP cable at minimum.
- 100Base-T Fast Ethernet requires CAT 5e UTP or STP cable at minimum.

The Ethernet cable can be terminated as a straight-through cable or a crossover cable and must be properly terminated for your application (figure 2-11).

- **Crossover cable** — Direct connection between the computer and the matrix switcher BME 0
- **Patch (straight) cable** — Connection of the matrix switcher BME 0 to an Ethernet LAN

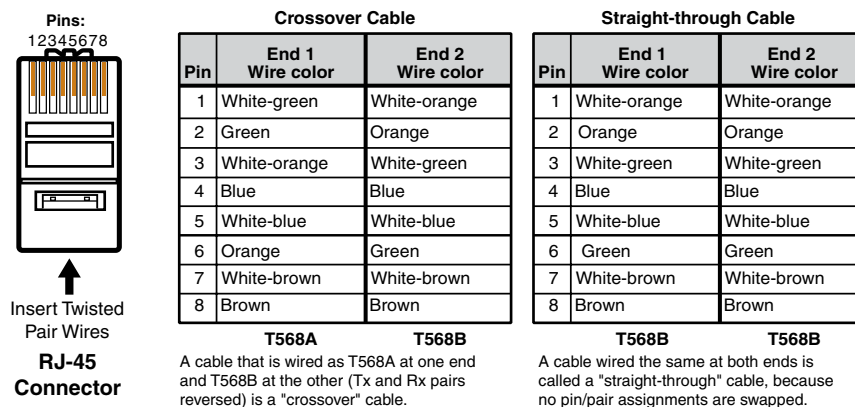


Figure 2-11 — RJ-45 connector and pinout tables

Reset button

- ⑩ **Reset button** — The Reset button initiates four levels of reset on the matrix switcher. Use an Extron Tweaker or a pen to press and hold the button while the switcher is running or while you power up the switcher for different reset levels.



See "Performing soft system resets (reset modes 3, 4, and 5)" in chapter 3, "Operation", for details.

- **Events (mode 3) reset** — Hold Reset for 3 seconds, then release and press it again to toggle events monitoring on and off.
- **IP settings (mode 4) reset** — Hold Reset for 6 seconds, then release and press it again to reset the switcher's IP functions.

NOTE *IP settings reset does not replace any user-installed firmware.*

- **Absolute (mode 5) reset** — Hold Reset for 9 seconds, then release and press it again to restore the switcher to the default factory settings.
- **Hard reset** — Hold Reset while powering up the switcher to restore the switcher to the default base firmware, user settings, and files.

NOTE *Hard reset does not clear the current configuration.*

External sync (systems with MAV Plus video BMEs)

The MAV Plus video switcher BME switches between inputs during the vertical interval period, resulting in glitch-free video switching. The MAV switcher can use an external signal to synchronize switching during the vertical interval. Without the external sync locking feature, switching between inputs can result in a brief rolling (sync loss) or a brief change in the picture size.

- ⑪ **Ext(ernal) Sync connector** — Connect an external sync signal to this BNC connector on BNC 0 for genlocking the video signal in broadcast or other sync-critical applications.

NOTE *In systems with multiple low resolution video BMEs (such as component video and S-video systems), only the External Sync connector on the luminance (Y) video plane's BME needs to be connected to the black burst generator. This BME should be BME 0.*

Figure 2-12, on the next page, shows a basic external sync configuration. The Ext Sync connector receives the timing signal. A tee connector on the BNC allows the signal to be passed on to another video device, if required. Terminate the tee connector if desired.

If no external sync timing source is connected to the switcher, switching occurs immediately.

Installation, cont'd

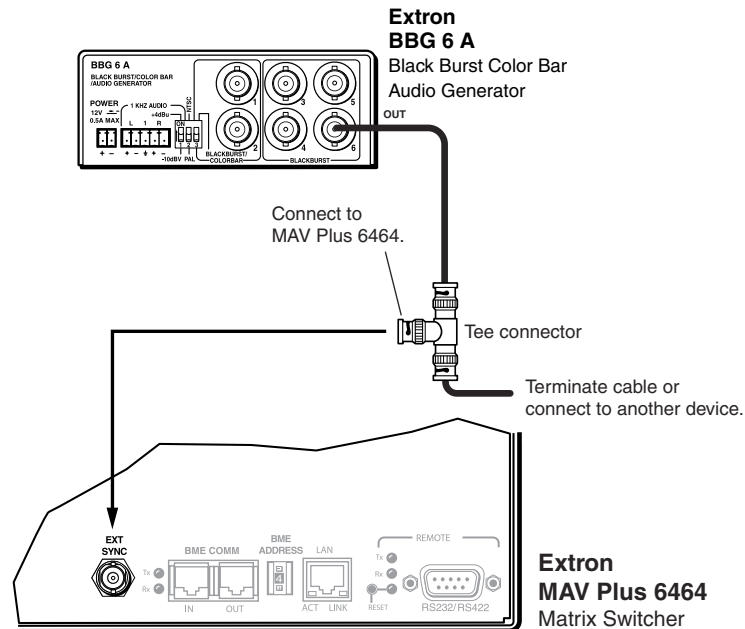


Figure 2-12 — Simple external sync connection example

Figure 2-13 shows another configuration, in which the timing source passes through three video cameras and a video scan converter before connecting to the switcher. This type of video camera can synchronize with the external timing source for video editing applications.

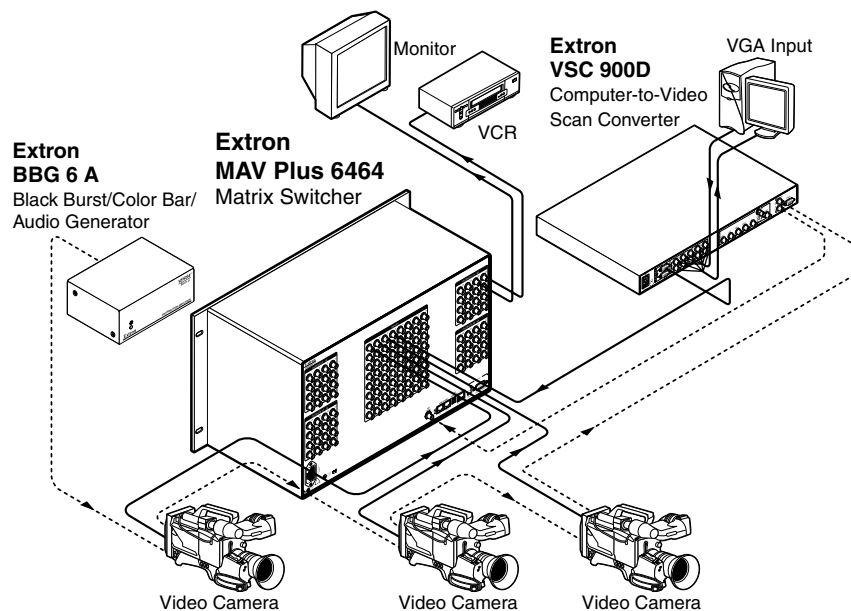


Figure 2-13 — Multiple device external sync connection example

Power

- ⑫ **AC power connector** — Plug a standard IEC power cord into this connector to connect the switcher to a 100 VAC to 240 VAC, 50 or 60 Hz power source.

Front Panel Configuration Port

- ⑬ **Configuration port** — This 2.5 mm mini stereo jack (figure 2-14) serves the same serial communications function as the rear panel Remote port, but it may be easier to access. The optional 9-pin D to 2.5 mm stereo mini TRS RS-232 cable, part #70-335-01 (figure 2-15) can be used for this connection.

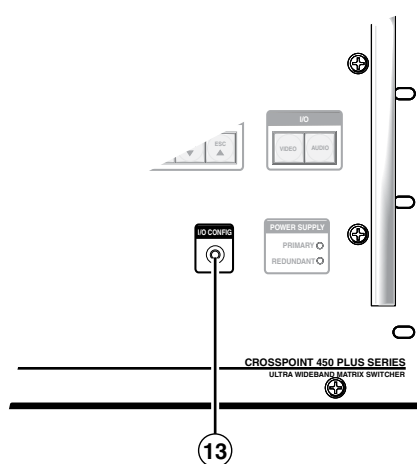


Figure 2-14 — Front panel configuration port

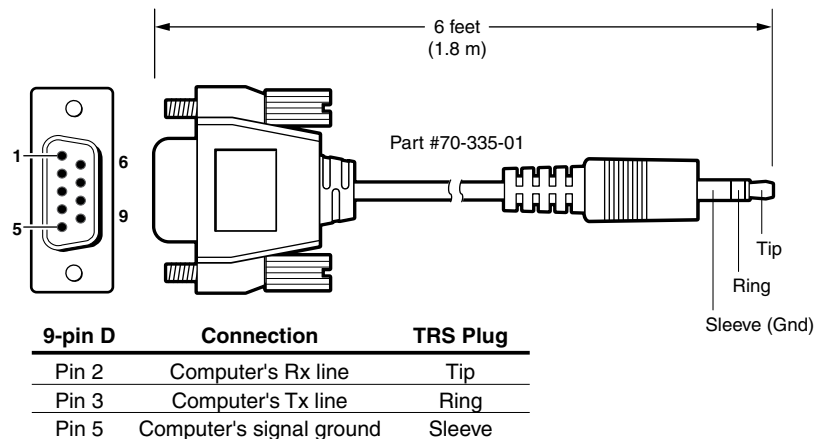


Figure 2-15 — Optional 9-pin TRS RS-232 cable

NOTE The maximum distances from the matrix switcher to the controlling device can vary up to 200 feet (61 m). Factors such as cable gauge, baud rates, environment, and output levels (from the switcher and the controlling device) all affect transmission distance. Distances of about 50 feet (15 m) are typically not a problem. In some cases the matrix switcher may be capable of serial communications via RS-232 up to 250 feet (76 m) away.

NOTE This port is completely separate from the rear panel Remote port and is *not* affected by changes to the rear panel port's protocol. This front panel port's protocol can be changed under SIS command control only.

This port is RS-232 only, with its default protocols as follows:

- 9600 baud
- no parity
- 8-bit
- 1 stop bit
- no flow control

Installation, cont'd



CrossPoint 450 Plus and MAV Plus Switchers

Chapter Three

Operation

Front Panel Controls and Indicators

QS-FPC Front Panel Operations

Rear Panel Operations

Optimizing the Audio (Systems with Audio BMEs)

Troubleshooting

Configuration Worksheets

Operation

- NOTE** *The operation of the CrossPoint 450 Plus switcher BMEs and MAV Plus switcher BMEs is very similar. There are two exceptions:*
- *The video selection button is labeled “RGBHV” on the CrossPoint 450 Plus switcher BMEs and “Video” on the MAV Plus switcher BMEs. Throughout this manual, the terms “RGBHV button” and “Video button” are used interchangeably.*
 - *The MAV Plus switcher BMEs do not offer RGB delay switching.*

- NOTE** *Some models are equipped with an integrated Quick Switch-Front Panel Controller (QS-FPC):*
- *The CrossPoint 450 Plus video BME is available with or without a QS-FPC.*
 - *The MAV Plus video BME is always equipped with a QS-FPC.*
 - *The CrossPoint 450 Plus sync BME is not available with a QS-FPC.*
 - *The MAV Plus audio BME (stereo or mono) is not available with a QS-FPC.*
 - *BMEs without a QS-FPC are equipped with a blank front panel.*

NOTE *The BME with the operational front panel controller should be BME 0.*

NOTE *Multiple QS-FPCs are unnecessary and potentially confusing. An S-video or component video system has multiple QS-FPCs by default. To avoid confusion, Extron recommends that you lock the redundant QS-FPCs. See “Setting the front panel locks (Executive modes)” on page 3-43.*

Front Panel Controls and Indicators

The QS-FPC front panel controls (figure 3-1) are grouped into two sets. The input and output buttons are grouped on the left side of the panel. The control buttons and I/O (video and audio) selection buttons are grouped on the right side of the panel.

NOTE While the number of inputs and outputs varies depending on the size of the matrix, all of the switchers in this family have the same 64 input buttons by 64 output buttons front panel arrangement (figure 3-1).

On switchers with a smaller matrix size, the higher-numbered buttons do not select inputs and outputs, although they are used to select and indicate preset numbers, indicate the input audio level, and indicate the output audio volume.

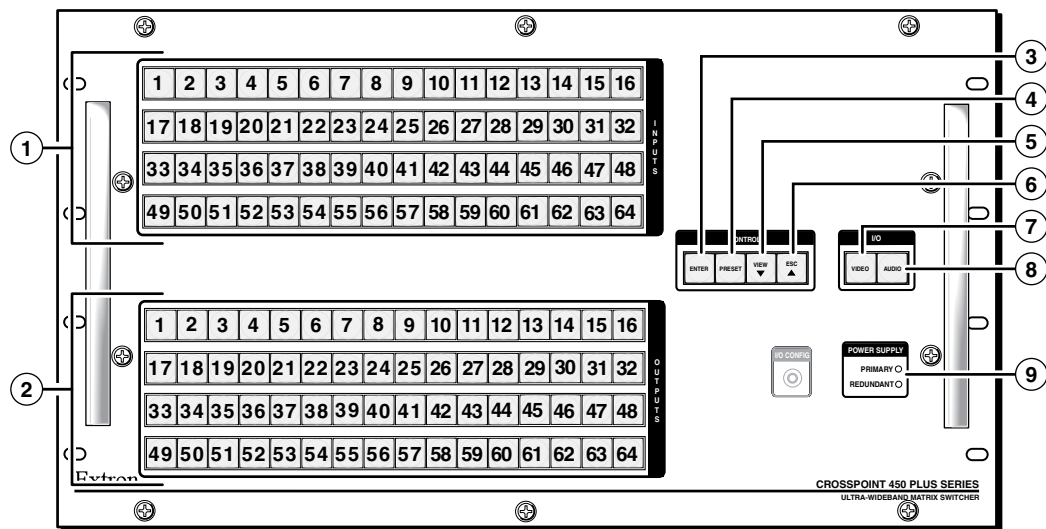


Figure 3-1 — CrossPoint 450 Plus 6464 series with integrated QS-FPC

The illuminated push buttons can be labeled with text, graphics, or both. The buttons can be set to provide amber background illumination all the time or the background illumination can be turned off (see "Background illumination", on page 3-45). The buttons either blink or are lit at full intensity (depending on the operation) when selected.

- ① Input buttons — See page 3-5.
- ② Output buttons — See page 3-5.
- ③ Enter button — See page 3-6.
- ④ Preset button — See page 3-7.
- ⑤ View button — See page 3-7.
- ⑥ Esc button — See page 3-8.
- ⑦ RGBHV/Video button — See page 3-9.
- ⑧ Audio button — See page 3-10.
- ⑨ Power Supply LEDs — See page 3-10.

Operation, cont'd





Input and output buttons

Primary functions			
	Action	Select an input or output for a tie being created.	
	Indications	<i>Blinking:</i> potential tie/untie <i>Lit:</i> current tie <i>Amber:</i> video and audio tie <i>Green:</i> video only tie <i>Red:</i> audio only tie	
		<div>1</div> <div>2</div> <div>3</div> <div>64</div>	through up to
Secondary functions			
I/O Grouping	Action 1	Input 1 and Output 1: Select I/O Group mode.	
	Action 2	Assign an input or output to the selected group.	
	Indication	<i>Lit:</i> Input or output is assigned to the selected group.	
Presets	Action	Select a preset in <i>Preset</i> mode.	
	Indication	<i>Lit:</i> A preset has already been saved to this location. <i>Blink:</i> Preset location is selected to be saved.	
RGB Delay	Indication	Systems with CrossPoint Wideband BMEs: <i>Input 1 through 10:</i> Indicate the RGB delay.	
Input audio level	Action (<i>inputs</i>)	Systems with audio BMEs: Select the input's audio for gain or attenuation adjustment.	
	Indication (<i>inputs</i>)	Input's audio is selected for adjustment.	
	Indication (<i>outputs</i>)	Indicate the input gain or attenuation level.	
Output audio volume	Action (<i>outputs</i>)	Systems with audio BMEs: Select the output's audio for volume adjustment.	
	Indication (<i>outputs</i>)	Output's audio is selected for adjustment.	
	Indication (<i>inputs</i>)	Indicate the output volume level.	
Mutes	Action (<i>outputs</i>)	Press and hold to mute the video and audio, video, or audio output.	
	Indication (<i>outputs</i>)	<i>Blinking:</i> Output is muted.	
Background illumination	Action	<i>Input 1 and Input 2:</i> Toggle between background illumination or buttons unlit.	

-
- ① **Input buttons** — The input buttons have one primary function (•) and six secondary (□) functions:
- Select and identify an input.
 - **(Input 1 only)** With the Output 1 button, select *I/O Group* mode. See "I/O grouping" on page 3-23.
 - Assign an input to the selected group in *I/O Group* mode and light to indicate its assignment. See "I/O grouping" on page 3-23.
 - Select a preset. See "Using presets" on page 3-29.
 - **(Systems with CrossPoint 450 Plus Wideband switcher BMEs, Input 1 through 10 only)** Display the RGB delay. See "Setting RGB delay (systems with wideband BMEs)" on page 3-27.
 - **(Systems with audio BMEs)** Display the output volume level. See "Viewing and adjusting the output volume (systems with audio BMEs)" on page 3-38.
 - **(Input 1 and Input 2 only)** Toggle background illumination of the buttons on and off. See "Background illumination" on page 3-45.
- ② **Output buttons** — The output buttons have one primary function (•) and four secondary (□) functions:
- Select and identify output(s).
 - **(Output 1 only)** With the Input 1 button, select *I/O Group* mode. See "I/O grouping" on page 3-23.
 - Assign an output to the selected group in *I/O Group* mode and light to indicate its assignment. See "I/O grouping" on page 3-23.
 - Mute the output. See "Muting and unmuting outputs" on page 3-32.
 - **(Systems with audio BMEs)** Display the audio level of the selected input. See "Viewing and adjusting the input audio level (systems with audio BMEs)" on page 3-35.

Operation, cont'd

Control buttons

Primary functions					
	Action	Save changes	Select <i>Preset</i> mode	Select <i>View</i> mode	Cancel/escape
	Indication	<i>Blinking</i> : save needed	<i>Blinking</i> : Save preset <i>Lit</i> : Recall preset	<i>View</i> mode selected	Flashes once
					
Secondary functions					
I/O Grouping	Action	Select group 1.	Select group 2.	Select group 3.	Select group 4.
	Indication	<i>Lit</i> : group selected.	<i>Lit</i> : group selected.	<i>Lit</i> : group selected.	<i>Lit</i> : group selected.
Port configuration	Action 1	Select <i>Configuration</i> mode			
	Action 2	Select 9600 baud.	Select 19200 baud.	Select 38400 baud.	Select 115200 baud.
	Indication	<i>Blinking</i> : rate selected	<i>Blinking</i> : rate selected	<i>Blinking</i> : rate selected	<i>Blinking</i> : rate selected
Front panel locks	Action	With Video and Audio, select <i>Lock</i> mode 2 or toggle between mode 0 and mode 2.			
RGB delay	Action			CrossPoint: In <i>RGB Delay</i> mode, decrease the switching interval.	
Audio	Action			In <i>Audio</i> mode, decrease input level or output volume.	In <i>Audio</i> mode, increase input level or output volume.

- ③ **Enter button** — The Enter button has two primary functions (•) and four secondary (◻) functions:
- Saves configuration or preset changes that you make on the front panel. To create a simple configuration:
 - a. Specify RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus switchers), Audio, or both (see I/O selection buttons [⑦] and [⑧]).
 - b. Press the desired input button (①).
 - c. Press the desired output button(s) (②).
 - d. Press the Enter button.
 - Indicates that a potential tie has been created but not saved.
 - ◻ In the *I/O Group* mode, selects group 1 and indicates the selection. See "I/O grouping" on page 3-23.
 - ◻ With the Preset, View, and Esc buttons, selects *Serial Port Configuration* mode. See "Selecting the rear panel Remote port protocol and baud rate" on page 3-46.
 - ◻ Selects 9600 baud for the RS-232/RS-422 port in *Serial Port Configuration* mode and indicate the selection. See "Selecting the rear panel Remote port protocol and baud rate" on page 3-46.
 - ◻ With the RGBHV/Video and Audio buttons, selects front panel security *Lock* mode 2 or toggle between mode 0 (unlocked) and mode 2. See "Setting the front panel locks (*Executive* modes)" on page 3-43.

-
- ④ **Preset button** — The Preset button has two primary functions (•) and three secondary (□) functions:
- Activates *Save Preset* mode to save a configuration as a preset and *Recall Preset* mode to activate a previously-defined preset.
 - Blinks when *Save Preset* mode is active and lights steadily when *Recall Preset* mode is active.
 - In the *I/O Group* mode, selects group 2 and indicates the selection. See "I/O grouping" on page 3-23.
 - With the Enter, View, and Esc buttons, selects *Serial Port Configuration* mode. See "Selecting the rear panel Remote port protocol and baud rate" on page 3-46.
 - Selects 19200 baud for the RS-232/RS-422 port in *Serial Port Configuration* mode and indicates the selection. See "Selecting the rear panel Remote port protocol and baud rate" on page 3-46.
- ⑤ **View (▼) button** — The View (▼) button has one primary function (•) and six secondary (□) functions:
- Selects and indicates *View-only* mode, which displays the current configuration.
- NOTE** View-only mode also provides a way to mute and unmute the outputs. See "Muting and unmuting outputs" on page 3-32.
- In the *I/O Group* mode, selects group 3 and indicates the selection. See "I/O grouping" on page 3-23.
 - **(Systems with CrossPoint 450 Plus Wideband switcher BMEs)** Decreases the RGB delay of switches to the selected output. See "Setting RGB delay (systems with wideband BMEs)" on page 3-27.
 - **(Systems with audio BMEs)** Decreases the audio level of the selected input. See "Viewing and adjusting the input audio level (systems with audio BMEs)" on page 3-35.
 - **(Systems with audio BMEs)** Decreases the volume of the selected output. See "Viewing and adjusting the output volume (systems with audio BMEs)" on page 3-38.
 - With the Enter, Preset, and Esc buttons, selects *Serial Port Configuration* mode. See "Selecting the rear panel Remote port protocol and baud rate" on page 3-46.
 - Selects 38400 baud for the RS-232/RS-422 port in *Serial Port Configuration* mode and indicates the selection. See "Selecting the rear panel Remote port protocol and baud rate" on page 3-46.

Operation, cont'd




- ⑥ **Esc (▲) button** — The Esc (▲) button has two primary functions (●) and six secondary (□) functions:

- Cancels operations or selections in progress and resets the front panel button indicators.

NOTE *The Esc (▲) button does **not** reset the current configuration, the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and Audio selection button, any presets, or any audio gain or attenuation or volume settings.*

- Flashes once to indicate that the escape function has been activated.
- In the *I/O Group* mode, selects group 4 and indicates the selection. See "I/O grouping" on page 3-23.
- **(Systems with CrossPoint 450 Plus Wideband switcher BMEs)** Increases the RGB delay of switches to the selected output. See "Setting RGB delay (systems with wideband BMEs)" on page 3-27.
- **(Systems with audio BMEs)** Increases the audio level of the selected input. See "Viewing and adjusting the input audio level (systems with audio BMEs)" on page 3-35.
- **(Systems with audio BMEs)** Increases the volume of the selected output. See "Viewing and adjusting the output volume (systems with audio BMEs)" on page 3-38.
- With the Enter, Preset, and View buttons, selects *Serial Port Configuration* mode. See "Selecting the rear panel Remote port protocol and baud rate" on page 3-46.
- Selects 115200 baud for the RS-232/RS-422 port in *Serial Port Configuration* mode and indicates the selection. See "Selecting the rear panel Remote port protocol and baud rate" on page 3-46.

I/O control buttons

Primary functions			
	Action	Select video.	Select audio.
	Indication	Green when selected	Red when selected
		  or 	
Secondary functions			
Front panel locks	Action 1	With Enter, select <i>Lock</i> mode 2 or toggle between mode 0 and mode 2.	
	Action 2	Select <i>Lock</i> mode 1 or toggle between mode 2 and mode 1.	
RGB delay	Action	Select <i>RGB Delay</i> mode.	
	Indication	<i>Blinking</i> : selected	
Resets	Action	Perform a system reset	
Port configuration	Action	Select RS-232.	Select RS-422.
	Indication	<i>Blinking</i> : selected	<i>Blinking</i> : selected
Audio	Action		Select <i>Audio</i> mode.
	Indication		<i>Blinking</i> : selected

You must specify video, audio, or both when you are creating or viewing a configuration. This is done with the RGBHV button (CrossPoint switchers) or Video button (MAV Plus switchers) (7) and Audio (8) buttons.

- 7 **RGBHV (CrossPoint 450 Plus) button or Video (MAV Plus) button** — The RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button has one primary function (•) and five secondary (□) functions:
- Selects and deselects video for a configuration that is being created or viewed and lights green to indicate that video is available for configuring or for viewing.
 - With the Enter button and Audio button, selects between front panel locks (*Lock* mode 2 and *Lock* mode 0). See "Setting the front panel locks (*Executive* modes)" on page 3-43.
 - With the Audio button, toggles the front panel lock on or off. See "Setting the front panel locks (*Executive* modes)" on page 3-43.
 - With the Audio button, commands the front panel system reset. See "Performing a system reset from the front panel" on page 3-44.
 - **(Systems with CrossPoint 450 Plus Wideband switcher BMEs)** Selects the *RGB delay* mode, in which you can set the RGB delay. See "Setting RGB delay (systems with wideband BMEs)" on page 3-27.
 - Selects the RS-232 protocol for the RS-232/RS-422 port in *Serial Port Configuration* mode and indicates the selection. See "Selecting the rear panel Remote port protocol and baud rate" on page 3-46.

Operation, cont'd

- ⑧ **Audio button** — The Audio button has one primary function (•) and five secondary (□) functions
- **(Systems with audio BMEs)** Selects and deselects audio for a configuration that is being created or viewed and lights to indicate that audio is available for configuration or viewing.
 - **(Systems with audio BMEs)** Selects the *Audio* mode, in which you can adjust the input audio level and the output audio volume. See "Viewing and adjusting the input audio level (systems with audio BMEs)" on page 3-35 and "Viewing and adjusting the output volume (systems with audio BMEs)" on page 3-38.
 - With the Enter button and RGBHV/Video button, selects between front panel locks (*Lock mode 2* and *Lock mode 0*). See "Setting the front panel locks (*Executive modes*)" on page 3-43.
 - With the RGBHV/Video button, toggles the front panel lock on or off. See "Setting the front panel locks (*Executive modes*)" on page 3-43.
 - With the RGBHV/Video button, commands the front panel system reset. See "Performing a system reset from the front panel" on page 3-44.
 - Selects the RS-422 protocol for the RS-232/RS-422 port in *Serial Port Configuration* mode and indicates the selection. See "Selecting the rear panel Remote port protocol and baud rate" on page 3-46.

Power indicators

All front panels have power indicators, regardless of whether they have integrated QS-FPCs or not (figure 3-2).

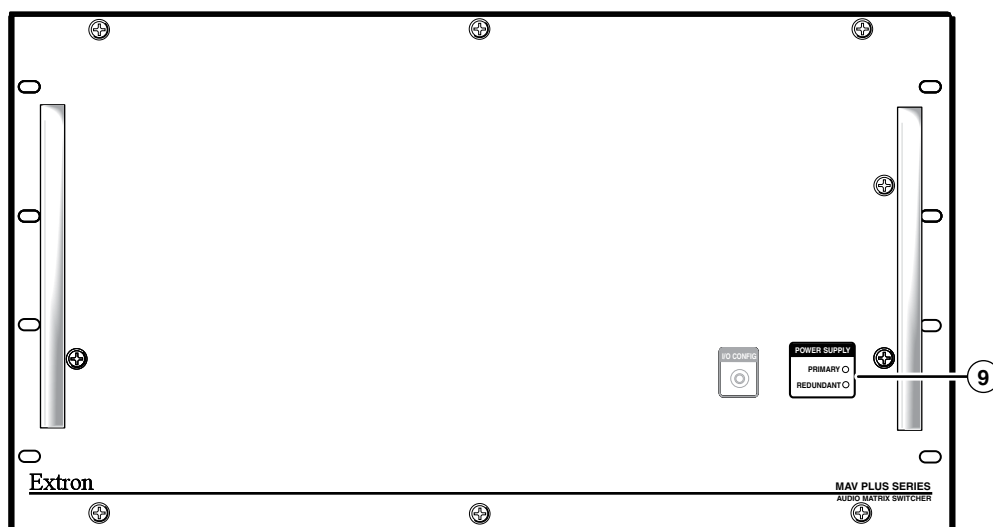
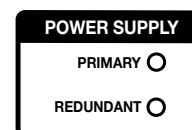


Figure 3-2 — Front panel without an integrated QS-FPC

- ⑨ **Primary and Redundant Power Supply LEDs** —
- Green** — Indicates that the associated power supply is operating within normal tolerances.
- Red** — Indicates that the associated power supply is operating outside the normal tolerances or has failed.



Button labels

The numbered translucent covers on the input and output buttons can be removed and replaced to insert labels behind them.

Input and output labels can be created easily with the Extron Button Label Generator software, which is shipped with every Extron matrix switcher. Each input and output can be labeled with a name, alphanumeric characters, or a color bitmap for easy and intuitive input and output selection (figure 3-3). See chapter 5, “Matrix Software”, for details on using the labeling software. See appendix B, “Reference Information”, for blank labels and a procedure for removing and replacing the translucent covers.

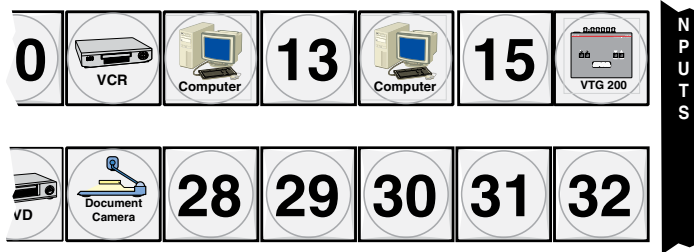


Figure 3-3 — Sample button labels and icons

QS-FPC Front Panel Operations

The following paragraphs detail the power-up process and then provide sample procedures for the following actions:

- Creating ties, sets of ties, and configurations
- Changing a configuration
- Viewing ties, sets of ties, and configurations
- Creating I/O groups
- Setting RGB Delay
- Saving and recalling presets
- Muting and unmuting outputs
- Viewing and adjusting the input audio level
- Viewing and adjusting the output volume
- Locking the front panel
- Performing front panel resets
- Setting background illumination
- Reading and setting the RS-232/RS-422 port settings

Definitions

The following terms, which apply to Extron matrix switchers, are used throughout this manual:

Tie — An input-to-output connection

Set of ties — An input **tied** to two or more outputs. (An output can never be tied to more than one input.)

Configuration — One or more **ties** or one or more **sets of ties**.

Current configuration — The **configuration** that is currently active in the switcher (also called **configuration 0**)

Global memory preset — A **configuration** that has been stored. Up to 64 **global memory presets** can be stored in memory. When a **preset** is retrieved from memory, it becomes the **current configuration**. Presets can be saved and recalled from the front panel or via any of the serial or LAN ports. For front panel operations, preset locations are assigned to the input buttons.

Room — A subset of outputs that are logically related to each other, as determined by the operator. The switchers support up to 10 **rooms**, each of which can consist of from 1 to 16 outputs.

Room memory preset — A **configuration** consisting of outputs in a single **room** that has been stored. When a **room preset** is retrieved from memory, it becomes the **current configuration**.

Power

Apply power by connecting the power cord to an AC source. The switcher performs a self-test that flashes the front panel button indicators (if so equipped) red, green, red, and amber and then turns them either off or to background illumination. An error-free power up self-test sequence leaves all control buttons either unlit or showing background illumination. The lit/unlit status RGBHV or Video button and the Audio button is defined by the system configuration.

- **Systems with audio** — RGBHV or Video and Audio both lit
- **Systems without audio** — RGBHV or Video lit and Audio unlit

The current configuration and all presets are saved in non-volatile memory. When power is applied, the most recent configuration is retrieved. The previous presets remain intact. BME 0, upon power up, issues a map refresh command to all slave BMEs to restore the current configuration.

NOTE *Because BME 0 maps the slave BMEs upon power up, either all BMEs should be powered up simultaneously or BME 0 should be the last BME turned on. Also, if any slave BME loses power, you need to issue any front panel command or simply cycle BME 0's power to restore the current configuration.*

If an error occurs during the self-test, the switcher locks up. If your switcher locks up on power-up, call the Extron S³ Sales & Technical Support Hotline. See the rear cover of this manual for the phone number in your region of the world.

Creating a configuration

Change the current configuration using the front panel buttons as follows:

1. Press the Esc button to clear any front panel button indications that may be lit.
2. Select to configure video, audio, or both by pressing the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button, Audio button, or both.
3. Select the desired input and output(s) by pressing the input and output buttons. Input buttons and output buttons light or blink green to indicate ties.
 - Input buttons light and output buttons light or blink one of the following colors:
 - **Amber:** Video and audio ties
 - **Green:** Video only ties
 - **Red:** Audio only ties
 - To indicate **potential ties**, output buttons **blink** the appropriate color when an input is selected.
 - To indicate **current ties**, output buttons **light steadily** the appropriate color when an input is selected.
 - To clear unwanted outputs, press and release the associated lit output buttons. To indicate **potential unties**, output buttons **blink** the appropriate color when an output is deselected but not untied from the input.
4. Press and release the Enter button to accept the tie.
5. Repeat steps 2 through 4 to create or delete additional ties until the desired configuration is complete.

NOTE

- Only one video input and one audio input can be tied to an output.
- If a tie is made between an input and an output, and the selected output was previously tied to another input, the older tie is broken in favor of the newer tie.
- If an input with no tie is selected, only that input's button lights (no output button lights).
- When the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and Audio button are lit, if an input with an audio tie but no video tie is selected, the input's button lights amber and the output button lights the appropriate color (amber, green, or red).
- As each input and output is selected, the associated output button blinks the appropriate color to indicate a tentative tie. Buttons for output(s) that were already tied to the input light the appropriate color steadily. Outputs that are already tied can be left on, along with new blinking selections, or toggled off by pressing the associated output button.
- If you press the input button for an I/O grouped input and then try to select an output in a different group, the associated output button cannot be selected. The associated input button remains lit.

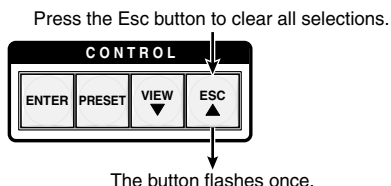
Operation, cont'd

Example 1: Creating a set of ties

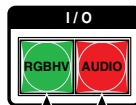
In the following example, input 5 video and audio are tied to outputs 3, 4, and 8. The steps show the front panel indications that result from your actions.

NOTE This example assumes that there are no ties in the current configuration.

1. **Clear all selections:** Press and release the Esc button.

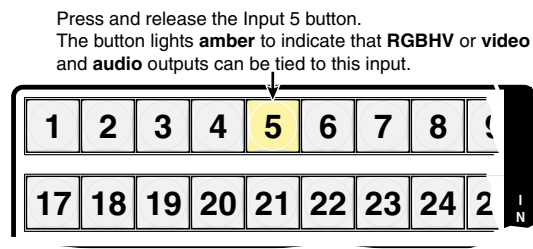


2. **Select video and audio for the tie:** If necessary, press and release the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and the Audio button until the buttons light.



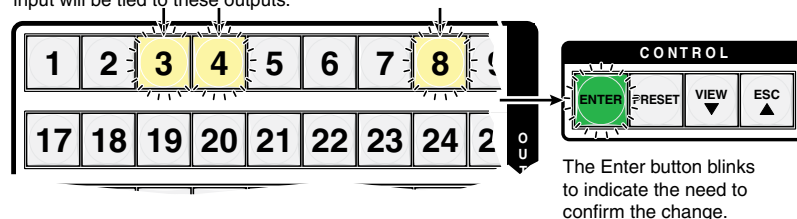
Press the RGBHV or Video button to toggle on and off. Press the Audio button to toggle on and off. The button lights **green** when selected. The button lights **red** when selected.

3. **Select an input:** Press and release the input 5 button.



4. **Select the outputs:** Press and release the output 3, output 4, and output 8 buttons.

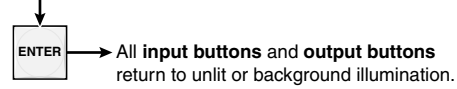
Press and release the Output 3, Output 4, and Output 8 buttons. The buttons blink **amber** to indicate that the selected **RGBHV** or **video** and **audio** input will be tied to these outputs.



NOTE You can cancel the entire set of ties at this point by pressing and releasing the Esc button. The Esc button flashes once.

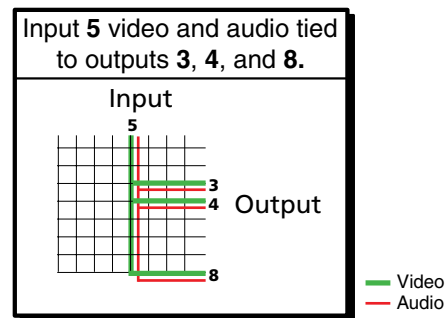
5. **Confirm the change:** Press and release the Enter button.

Press the Enter button to confirm the configuration change.



The Enter button returns to unlit or background illumination.

The current configuration is now input 5 video and audio tied to output 3, output 4, and output 8.



Operation, cont'd

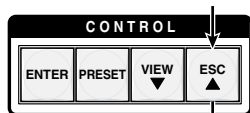
Example 2: Adding a tie to a set of ties

In the following example, a new video tie is added to the current configuration. The steps show the front panel indications that result from your actions.

NOTE This example assumes that you have performed example 1.

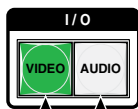
1. **Clear all selections:** Press and release the Esc button.

Press the Esc button to clear all selections.



The button flashes once.

2. **Select video only for the tie:** If necessary, press and release the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and the Audio button.



Press the RGBHV or Video button to toggle on and off. Press the Audio button to toggle on and off.

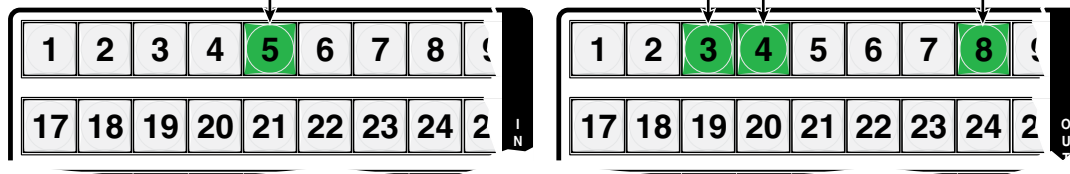
The button lights **green** when selected. The button is **unlit** or **background illuminated** when deselected.

3. **Select an input:** Press and release the input 5 button.

Press and release the Input 5 button.

The button lights **green** to indicate that **RGBHV** or **video** outputs can be tied to or untied from this input.

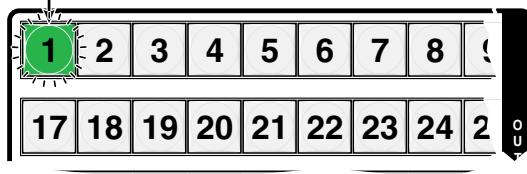
The Output 3, Output 4, and Output 8 buttons light **green** to indicate the **RGBHV** or **video** ties created in example 1.



4. **Select the output:** Press and release the output 1 button.

Press and release the Output 1 button.

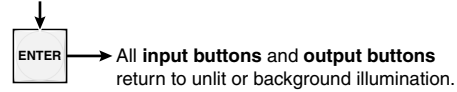
The button blinks **green** to indicate that only the selected **RGBHV** or **video** input will be tied to this output.



The Enter button blinks to indicate the need to confirm the change.

5. **Confirm the change:** Press and release the Enter button.

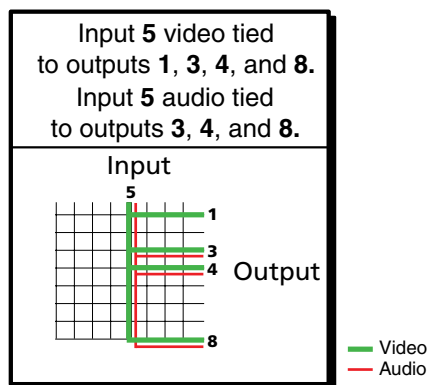
Press the Enter button to confirm the configuration change.



The Enter button returns to unlit or background illumination.

The current configuration is now:

- Input 5 video tied to output 1, output 3, output 4, and output 8
- Input 5 audio tied to output 3, output 4, and output 8



Operation, cont'd

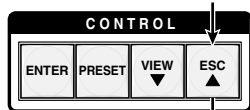
Example 3: Removing a tie from a set of ties

In the following example, an existing audio tie is removed from the current configuration. The steps show the front panel indications that result from your actions.

NOTE This example assumes that you have performed example 1 and example 2.

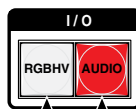
1. **Clear all selections:** Press and release the Esc button.

Press the Esc button to clear all selections.



The button flashes once.

2. **Select audio only for the tie:** If necessary, press and release the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and the Audio button.

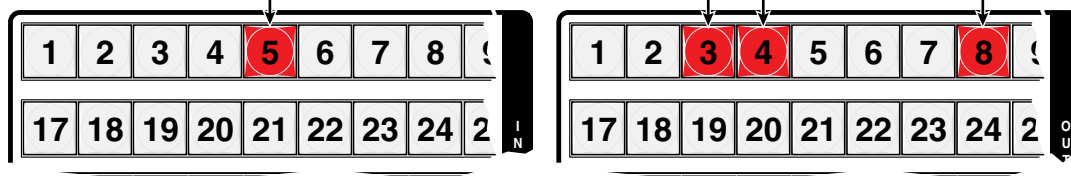


Press the RGBHV or Video button to toggle on and off. The button is **unlit** or **background illuminated** when deselected. Press the Audio button to toggle on and off. The button lights **red** when selected.

3. **Select an input:** Press and release the input 5 button.

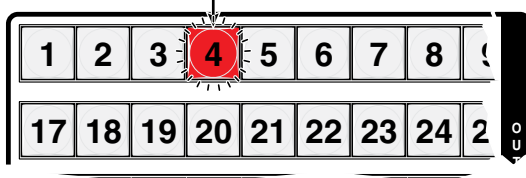
Press and release the Input 5 button. The button lights **red** to indicate that **audio** outputs can be tied to or untied from this input.

The Output 3, Output 4, and Output 8 buttons light **red** to indicate the **audio** ties created in example 1. The output 1 button **does not light** to indicate the tie created in example 2 because that tie is **RGBHV** or **video** only.



3. **Select the output:** Press and release the output 4 button.

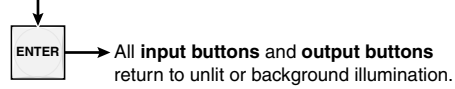
Press and release the Output 4 button. The button blinks **red** to indicate the pending change: **audio** input will be untied.



The Enter button blinks to indicate the need to confirm the change.

5. **Confirm the change:** Press and release the Enter button.

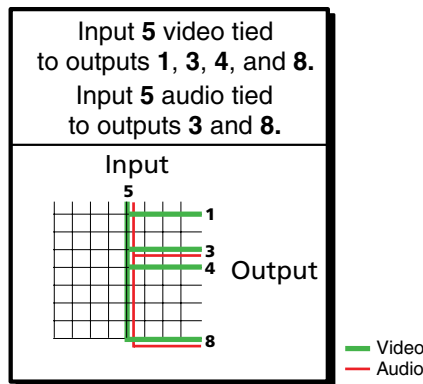
Press the Enter button to confirm the configuration change.



The Enter button returns to unlit or background illumination.

The current configuration is now:

- **Video** — Input 5 video tied to output 1, output 3, output 4, and output 8
- **Audio** — Input 5 audio tied to output 3 and output 8



Viewing a configuration

The current configuration can be viewed using the front panel buttons. The *View-only* mode prevents inadvertent changes to the current configuration. *View-only* mode also provides a way to mute video and audio outputs (see "Muting and unmuting outputs" on page 3-32).

View the current configuration as follows:

1. Press the Esc button to clear any front panel button indications that may be on.
2. Press and release the View button. All of the buttons light for outputs that are **not** tied:
 - **Amber**: No tied video **and** audio input
 - **Green**: No tied video input
 - **Red**: No tied audio input
3. Select video, audio, or both to view by pressing the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button, Audio button, or both.
4. Select the desired input or output(s) whose ties you wish to view by pressing the input and output buttons.
5. Press and release the View button to exit *View-only* mode:

- NOTE**
- *When you enter View-only mode, the output buttons light for all outputs without ties.*
 - *If you are viewing tied inputs and outputs and an output button for which there are no ties is pushed, the output buttons light for all outputs without ties.*
 - *To see all ties of the current configuration, press and release each input and output button, one at a time, with the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and the Audio button lit.*
 - *In View-only mode, you can view video and audio, video-only, or audio-only ties. Pressing and releasing the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and the Audio button toggles each on and off.*
 - *When you view video and audio ties, the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button is lit green and the Audio button is lit red. After you select an input or output, the output buttons light the following colors to show where video and audio ties are not the same (audio is broken away):*
 - **Amber** — video and audio
 - **Green** — video only
 - **Red** — audio only
 - *After 30 seconds of front panel inactivity, View-only mode automatically deselects.*

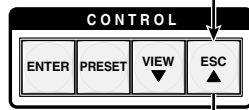
Example 4: Viewing video and audio, audio only, and video only ties

In the following example, the ties in the current configuration are viewed. The steps show the front panel indications that result from your actions.

NOTE This example assumes that you have performed example 1, example 2, and example 3.

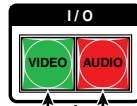
1. **Clear all selections:** Press and release the Esc button.

Press the Esc button to clear all selections.



The button flashes once.

2. **Select View-only mode:** Press and release the View button to enter *View-only* mode. The View button lights red.
3. **Select both video and audio for viewing:** If necessary, press and release the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and the Audio button.



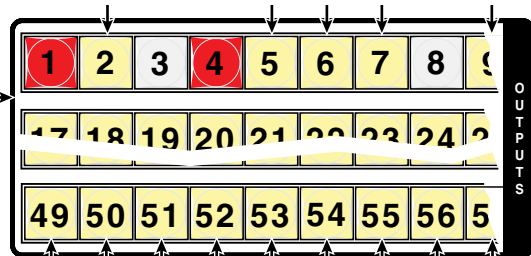
Press the RGBHV or Video button to toggle on and off.

The button lights when selected.

Press the Audio button to toggle on and off.

The button lights when selected.

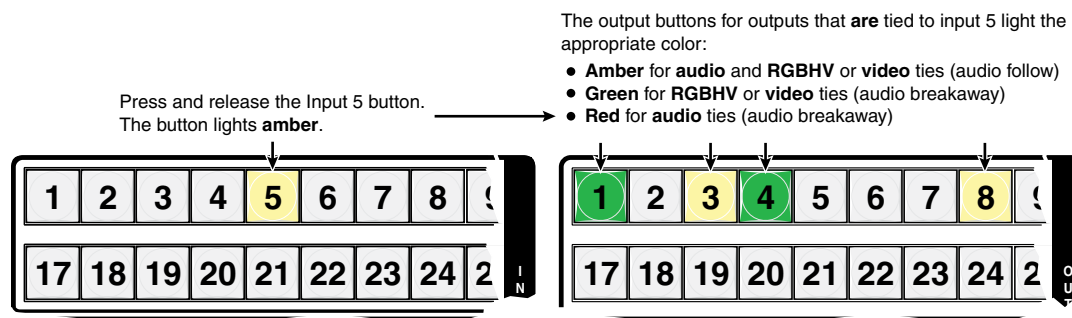
Until you select an input, the buttons for all untied outputs light **amber** if **no inputs** are tied, **green** if **no video inputs** are tied (only audio is tied), or **red** if **no audio inputs** are tied (only video is tied).



Until you select an input, the buttons for all untied outputs light **amber** if **no inputs** are tied, **green** if **no video inputs** are tied (only audio is tied), or **red** if **no audio inputs** are tied (only video is tied).

Operation, cont'd

4. Select an input: Press and release the input 5 button.

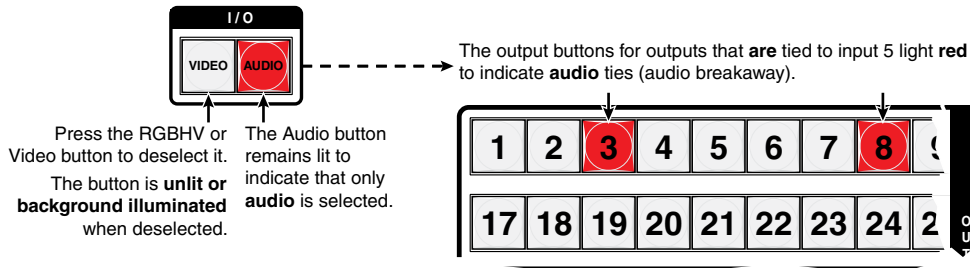


The output buttons for outputs that are **not** tied to input 5 are either unlit or background illuminated.

NOTE You can also view a set of ties by selecting a tied output. For example, note the number of a lit output button, and then press and release the output button for an untied (unlit or background illuminated) output. Observe that all of the untied outputs light. Then press the output button that you noted previously and observe that the following light:

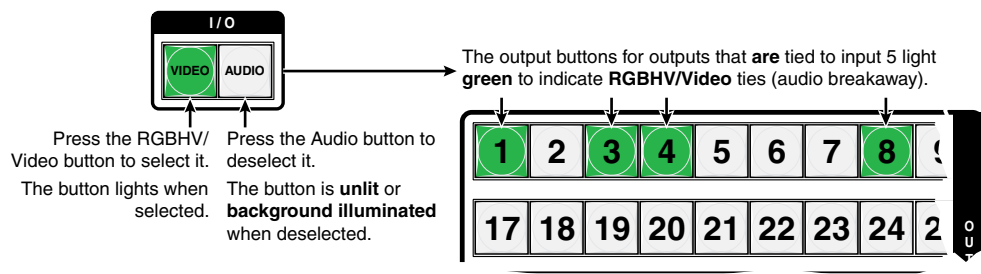
- The selected output button
- The tied input button (input 5)
- The output buttons for all of the other outputs that are tied to the input.

5. Deselect RGBHV or Video: Press and release the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button.



The output buttons for outputs that are **not** tied to input 5 are either unlit or background illuminated.

6. Deselect Audio and select RGBHV or Audio: Press and release the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and the Audio button.

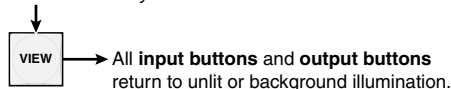


The output buttons for outputs that are **not** tied to input 5 are either unlit or background illuminated.

If video ties are established for input 5, the output buttons for all video outputs tied to input 5 light green. If no ties are established for input 5, all output buttons return to either unlit or to background illumination.

7. **Exit *View-only* mode:** Press and release the View button to exit *View-only* mode.

Press the View button to exit *View-Only* mode.



The View button returns to

I/O grouping

I/O grouping is a matrix switcher feature that lets you subdivide the front panel controls of the matrix into as many as four smaller functional sub-switchers (figure 3-4) and limit tie creation. The I/O group limitation applies to tie creation **from the front panel only**. Inputs and outputs can be assigned to one of four groups or not assigned to any group.

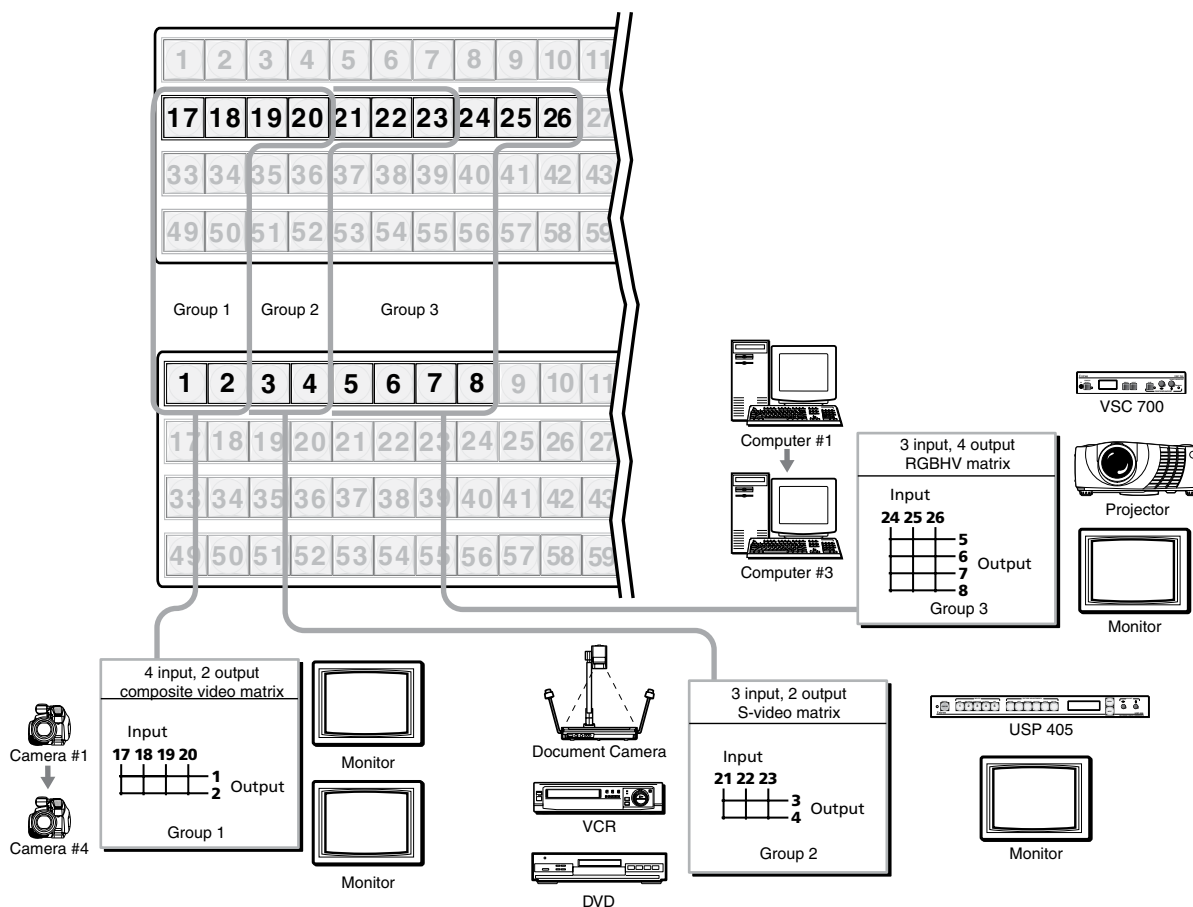


Figure 3-4 — I/O grouping of incompatible video formats

When you are creating ties on the front panel, inputs and outputs that are assigned to a group can be tied only to other outputs and inputs within the same group. For example, you cannot tie an input that is assigned to group 1 to an output that is assigned to group 2. Ungrouped inputs and outputs can be switched to outputs and inputs in any group. Ties between groups (for example, an input in group 1 tied to an output in group 2) can be created under RS-232/RS-422 or Ethernet control.

Operation, cont'd

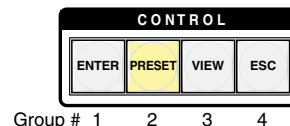
Suggested applications for the I/O grouping feature include:

- Segregating specific video formats to prevent an input in one video format from being inadvertently applied to an output device that supports another video format
- Segregating input and output devices that are in separate rooms
- Isolating video so that it is not displayed on specific output devices for operational security reasons

The I/O groups can be set on the front panel or by using either serial port or the Ethernet port and either the SIS, Windows control program, or HTML pages (see chapter 4, “Programmer’s Guide” and chapter 5, “Matrix Software”).

Create I/O groups on the front panel as follows:

1. Press the Esc button to clear any front panel button indications that may be lit.
2. To enter *I/O Group* mode, press and **hold** the Input 1 and Output 1 buttons until the input and output buttons light to display the ungrouped inputs and outputs.
3. Press and release one of the Control buttons to select a group:
 - Press the Enter button to select group 1.
 - Press the Preset button to select group 2.
 - Press the View button to select group 3.
 - Press the Esc button to select group 4.
4. Select the desired input(s) and output(s) to assign to the group by pressing the input and output buttons.
5. Press and release the RGBHV or Video button and the Audio button to exit the I/O Group mode, or allow the I/O Group mode to time out after approximately 30 seconds.

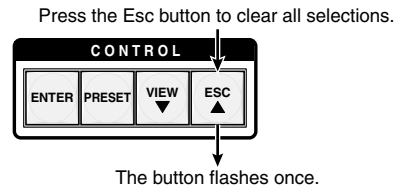


- NOTE**
- *Ties between groups (an input in group 1 tied to an output in group 2) can be created under the control of either serial port or the LAN port.*
 - *Ties that were created before I/O groups were created remain valid, even if they include inputs and outputs in different groups.*
 - *Presets can be created under serial port or Ethernet port control that tie inputs and outputs across group boundaries. These presets **are** selectable from the front panel.*
 - *An input or output can be assigned to only one group. If you assign an input or output to a group and that input or output is already assigned to a different group, the older grouping is discarded in favor of the new grouping.*
 - *Audio can be broken away from the video for a given input or output (assigned to different groups) by isolating only video or only audio using the front panel RGBHV (CrossPoint 450 Plus) or Video (MAV Plus) button, the Audio button, or both after you select I/O Group mode (between steps 2 and 3). Audio breakaway across different groups can be confusing when you are operating the front panel; it is not displayed by the Matrix Switchers Control Program, HTML pages, or SIS commands; and it is not recommended.*
 - *For I/O groups to have any function, at least two groups must be created.*

Example 5: Grouping inputs and outputs

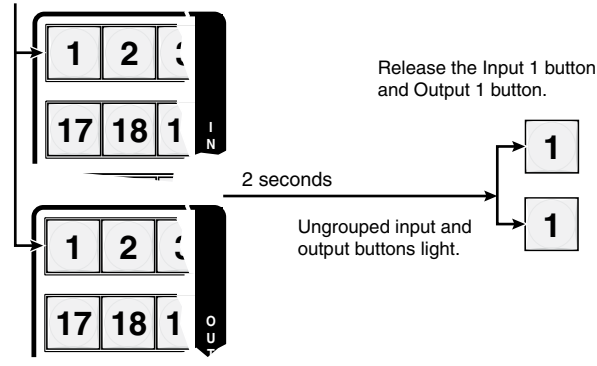
In the following example, several switcher inputs and outputs are assigned to groups. The steps show the front panel indications that result from your actions.

1. **Clear all selections:** Press and release the Esc button.



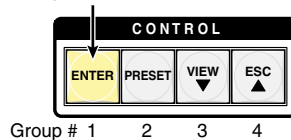
2. **Select I/O Group mode:** Press and **hold** the Input 1 and Output 1 buttons for approximately 2 seconds and then release the buttons.

Press and **hold** the Input 1 button and Output 1 button.



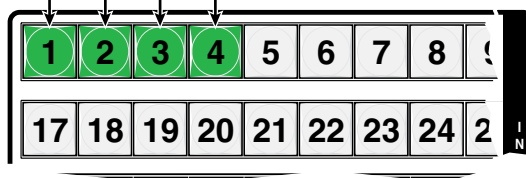
3. **Select an I/O group:** Press and release the Enter button to select group 1.

Press and release the Enter button to select group 1.
The button lights to indicate the selection.

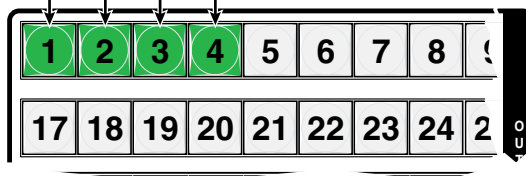


4. **Assign inputs and outputs:** Press and release the input 1 through 4 and output 1 through 4 buttons.

Press and release the Input 1 through Input 4 buttons. The selected buttons light.



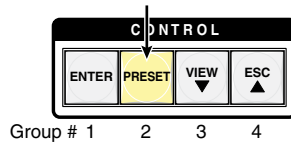
Press and release the Output 1 through Output 4 buttons. The selected buttons light.



Operation, cont'd

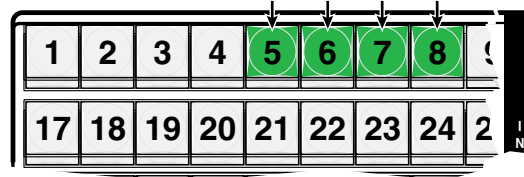
5. **Select a different I/O group:** Press and release the Preset button to select group 2.

Press and release the Preset button to select group 2.
The button lights to indicate the selection.

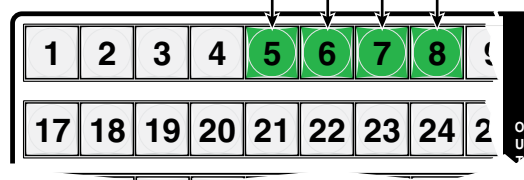


6. **Assign inputs and outputs:** Press and release the input 5 through 8 and output 5 through 8 buttons.

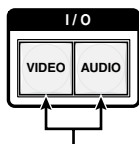
Press and release the Input 5 through Input 8 buttons. The selected buttons light.



Press and release the Output 5 through Output 8 buttons. The selected buttons light.



7. **Exit I/O Group mode:** Simultaneously press and release the RGBHV (CrossPoint switchers) or Video (MAV Plus switchers) button and the Audio button. The switcher exits I/O Group mode.



Press and release both buttons.

NOTE As an alternative, if you do not push any front panel buttons for approximately 30 seconds, the front panel times out and the switcher exits I/O Group mode.

- Group 1 consists of inputs 1 through 4 and outputs 1 through 4.
- Group 2 consists of inputs 5 through 8 and outputs 5 through 8.

Setting RGB delay (systems with wideband BMEs)

A switcher that includes a CrossPoint 450 Plus Sync BME can briefly blank the RGB (video) output while it switches to the new input's sync source, and then switches the RGB signals. This allows a brief delay for the display to adjust to the selected input's sync timing before displaying the new picture, which appears without glitches. RGB delay, also known as Triple-Action Switching or video mute switching, is user selectable from 0 to 5 seconds, in half-second increments.

The RGB delay interval can be set on the front panel or by using either serial port or the Ethernet port and either the SIS, Windows control program, or HTML pages (see chapter 4, "Programmer's Guide", chapter 5, "Matrix Software", and chapter 6, "HTML operation"). Specify the RGB delay interval for a specific output on the front panel as follows:

NOTE *RGB delay is protected when front panel lock mode 2 is selected. You can view the delay in lock mode 2, but not change it from the front panel. See "Setting the front panel Locks (Executive modes)" on page 3-43.*

1. Press the Esc button to clear any front panel button indications that may be lit.
2. To enter *RGB Delay* mode, press and **hold** the RGBHV button until the button begins to blink green, then release the button.
3. Press and release an output button to select an output.

Each lit input button, from Input 1 through Input 10, indicates a half second of RGB delay interval for the selected output.

4. Press and release the Esc (▲) and View (▼) buttons to increase and decrease the interval.
5. Press and release the RGBHV button to exit the *RGB Delay* mode. The RGBHV button stops blinking.

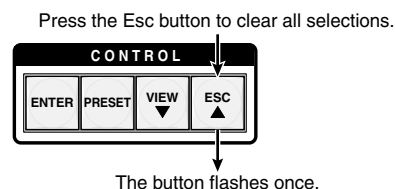
NOTE

- Pressing the Enter or Preset button also exits RGB Delay mode. Pressing the Preset button changes to Recall Preset mode.
- The RGB interval for each output is stored in non-volatile memory. When power is removed and restored, the delay settings are retained.
- Exiting RGB Delay mode by pressing the RGBHV button always returns the I/O configuration to audio only selected for configuration.

Example 6: Setting the RGB delay for an output

In the following example, the RGB delay is increased for output 17. The steps show the front panel indications that result from your actions.

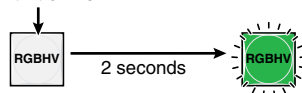
1. **Clear all selections:** Press and release the Esc button.



Operation, cont'd

2. **Enter RGB Delay mode:** Press and **hold** the RGBHV button for approximately 2 seconds until it blinks.

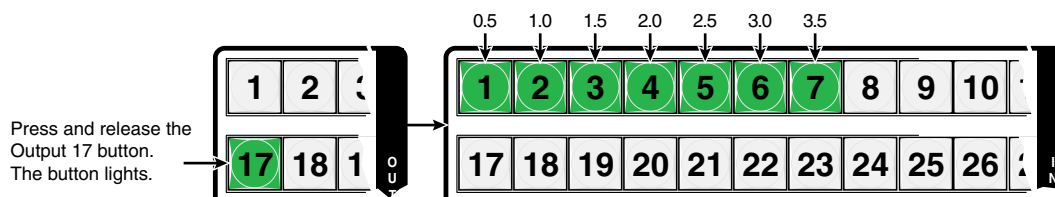
Press and hold the RGBHV button until it blinks.



3. **Select an output:** Press and release the Output 17 button.

The Input 1 through Input 10 buttons display the selected output's RGB delay. Each lit input button indicates 0.5-second of delay.

In this example, the lit input buttons display 3.5 seconds of RGB delay.



NOTE The RGB delay is protected when front panel lock mode 2 is selected. You can view the delay in lock mode 2, but not change it from the front panel. See "Setting the front panel Locks (Executive modes)" on page 3-43.

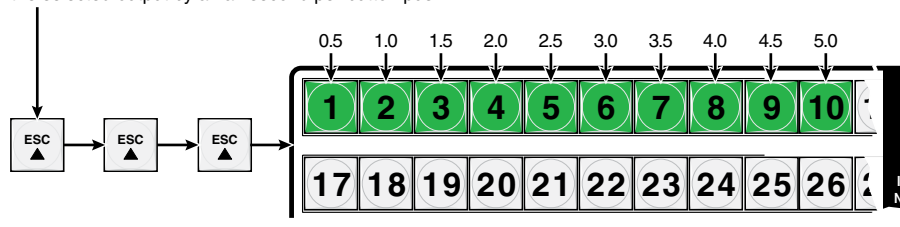
If front panel lock mode 2 is selected and you try to perform step 4, the actions are ignored and the Enter, RGBHV, and Audio buttons flash.

4. **Increase the delay:** Press and release the Esc (▲) button once to increase the RGB delay by a half second.

Press and release the Esc (▲) button twice more to increase the RGB delay by a whole second. Note the input button indications that change each time the Esc (▲) button is pressed and released.

The figure below show the result of pressing the Esc (▲) button a total of three times.

Press the Esc button to increase the RGB interval that is applied to switches to the selected output by a half second per button push.

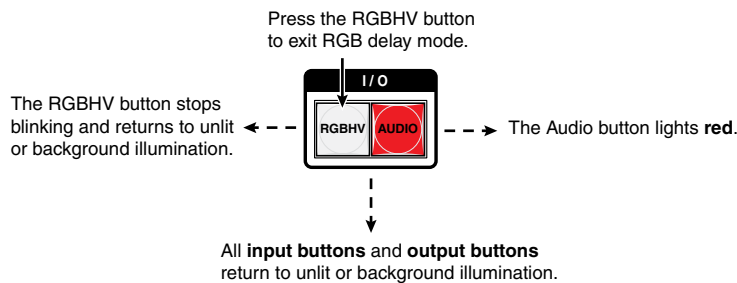


The Input 1 through Input 10 buttons display the selected output's RGB delay. Each lit input button indicates 0.5-second of delay.

In this example, the lit input buttons display 5.0 seconds of RGB interval.

NOTE You can press and **hold** the Esc (▲) or View (▼) button to ramp the delay up or down to the high or low limit.

5. **Exit RGB Delay mode:** Press and release the RGBHV button.



Using presets

The current configuration (configuration 0) can be saved as a preset in any one of 64 preset memory addresses. Presets can be saved and recalled from the front panel. The preset locations are assigned to the input buttons. When a **preset** is retrieved from memory, it becomes the **current configuration**.

- NOTE**
- All switchers have 64 presets, selectable from the front panel, regardless of the matrix size.
 - Only the audio and video ties are stored and recalled; audio gain and volume settings are not saved, and they do not change when a preset is recalled.
 - Presets **cannot** be viewed from the front panel unless recalled as the current configuration. Presets **can** be viewed using the Extron Windows-based control program. See chapter 5, “Matrix Software”, for more details.
 - The current configuration and all presets are stored in non-volatile memory. When power is removed and restored, the current configuration is still active and all presets are retained.
 - When a preset is recalled, it replaces the current configuration, which is lost unless it is also stored as a preset. The recalled preset overwrites all of the current configuration ties in favor of the preset configuration ties.

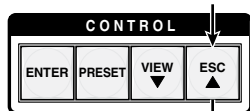
Operation, cont'd

Example 7: Saving a preset

In the following example, the current configuration is saved as a preset. The steps show the front panel indications that result from your actions.

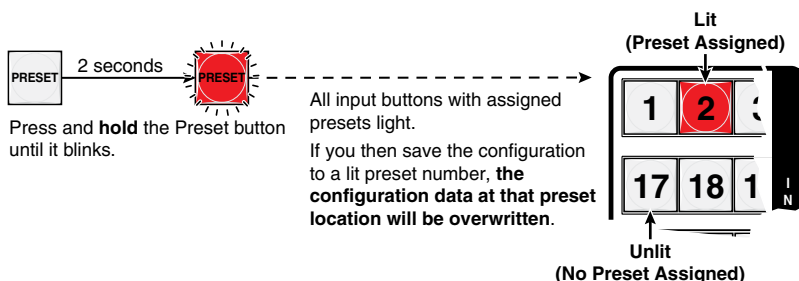
1. **Clear all selections:** Press and release the Esc button.

Press the Esc button to clear all selections.



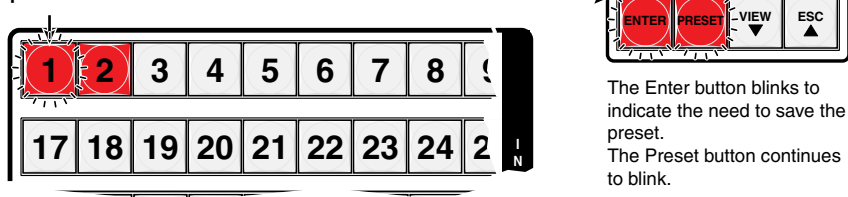
The button flashes once.

2. **Select Save Preset mode:** Press and **hold** the Preset button for approximately 2 seconds until it blinks.



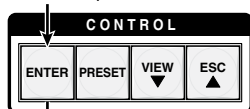
3. **Select the preset:** Press and release the input button for the desired preset.

Press and release the Input 1 button.
The button blinks to indicate that this **preset** number is selected but not saved.



4. **Confirm the change:** Press and release the Enter button. The current configuration is now stored in the selected memory location.

Press the Enter button to save the preset.



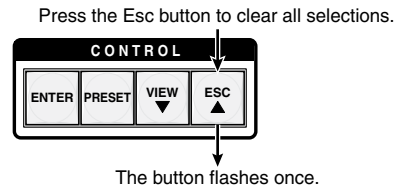
The Enter and Preset buttons return to unlit or background illumination.

All input buttons and output buttons return to unlit or background illumination.

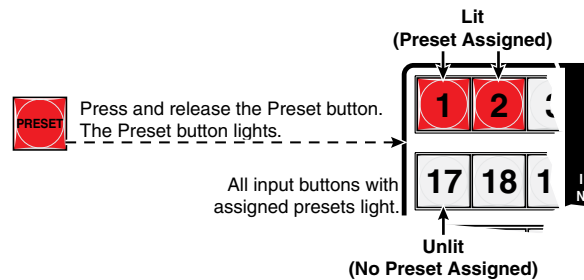
Example 8: Recalling a preset

In the following example, a preset is recalled to become the current configuration. The steps show the front panel indications that result from your actions.

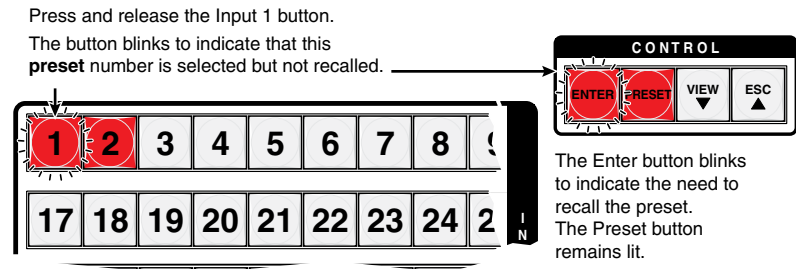
1. **Clear all selections:** Press and release the Esc button.



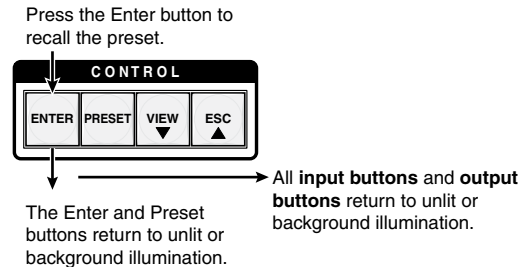
2. **Select Recall Preset mode:** Press and release the Preset button.



3. **Select the preset:** Press and release the input button for the desired preset.



4. **Confirm the change:** Press and release the Enter button. The configuration stored in the selected memory location is now the current configuration and can be viewed in the *View-only* mode (see example 4).



Muting and unmuting outputs

Individual outputs can be muted or unmuted as follows:

NOTE *Mutes are protected when front panel Lock mode 2 is selected. You can view the status of the output (muted or unmuted) in Lock mode 2 but you cannot change it from the front panel. See “Setting the front panel Locks (Executive modes)” on page 3-43.*

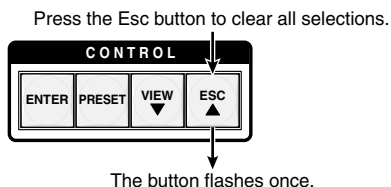
1. Press the Esc button to clear any input button indications, output button indications, or control button indications that may be on.
2. Press and release the View button.
3. Select video, audio, or both to mute or unmute by pressing the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and the Audio button.
4. **One at a time**, press and **hold** the button(s) for the desired output(s) for approximately 2 seconds. The output button(s) for the selected output(s) blink to indicate the mute or return to their previous state to indicate the unmute.
5. Press and release the View button to return to normal switcher operation.

- NOTE**
- *You can mute video and audio, video-only, or audio-only outputs. Pressing and releasing the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and the Audio button toggles each selection on and off.*
 - *When you enter View-only mode, the output LEDs turn **on** for all outputs **without** ties.*
 - *On CrossPoint 450 Plus switchers, the video mute function mutes the wideband video switching BMEs (the R, G, and B planes) only; the sync switching BMEs (the H and V planes) are still active. On MAV Plus low resolution video switching BMEs, the video mute function mutes all video planes.*
 - *Mutes are saved to non-volatile memory. When power is removed and restored, the mute settings are retained.*

Example 9: Muting and unmuting an output

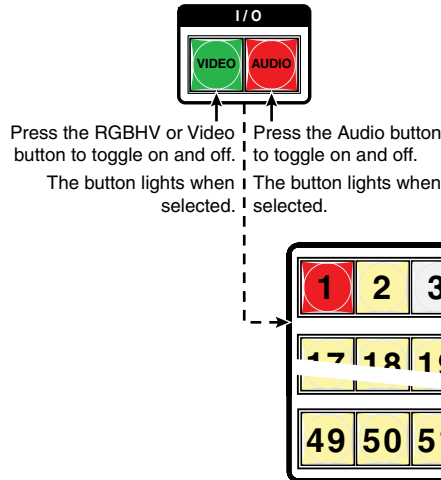
In the following example, several switcher outputs are muted and unmuted. The steps show the front panel indications that result from your actions.

1. **Clear all selections:** Press and release the Esc button.



2. **Enter View-only mode:** Press and release the View button to enter *View-only* mode. The View button lights red.

3. **Select video and audio:** If necessary, press and release the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and the Audio button.



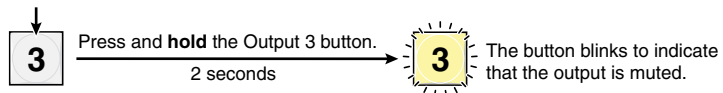
NOTE This example shows the front panel indications if example 1, example 2, and example 3 have been completed.

NOTE Output mutes are protected when front panel Lock mode 2 is selected. You can view the mutes in Lock mode 2 but you cannot change them from the front panel. See "Setting the front panel Locks (Executive modes)" on page 3-43.

If front panel Lock mode 2 is selected and you try to perform steps 4 and 5, the actions are ignored.

4. **Mute the outputs: One at a time,** press and **hold** the Output 3 button and then the Output 4 button for approximately 2 seconds until each button begins to blink. The output 3 and output 4 signals are muted.

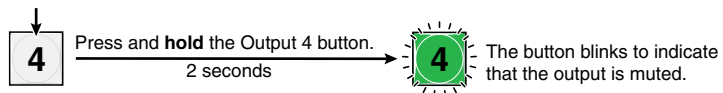
Mute outputs one at a time.



Green = Video is muted.

Red = Audio is muted.

Amber = Video and audio are muted. (Amber is visible only after you have selected the Video and Audio buttons).



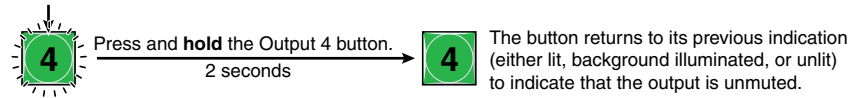
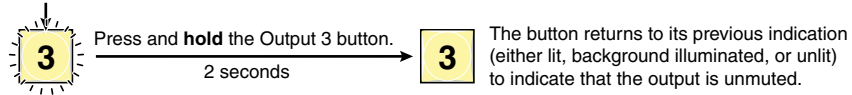
NOTE If RGBHV or video and audio are both selected, the mute action toggles both the video and audio outputs. If either the video output or the audio output is already muted, the unmuted output is muted and the muted output is unmuted.

NOTE If RGBHV or video and audio are both selected and only video is muted, the output button flashes between green and amber. If only audio is selected, the output button flashes between red and amber.

Operation, cont'd

5. **Unmute the outputs: One at a time**, press and **hold** the Output 3 button and then the Output 4 buttons for approximately 2 seconds until each button lights steadily. The output 3 and output 4 signals are unmuted.

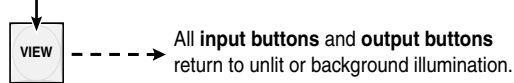
Unmute outputs one at a time.



NOTE *If RGBHV or video and audio are both selected, the unmute action toggles both the video and audio outputs. If either the video output or the audio output is already unmuted, the muted output is unmuted and the unmuted output is muted.*

6. **Exit View-only mode:** Press and release the View button to exit *View-only* mode.

Press the View button
to exit *View-Only* mode.



The View button returns to
unlit or background
illumination.

Viewing and adjusting the input audio level (systems with audio BMEs)

In systems that include a MAV Plus audio BME, the audio level of each input can be displayed and adjusted through a range of -18 dB to +24 dB, in 0.5 dB increments, to ensure that there is no noticeable volume difference among sources (figure 3-5). The audio level can be adjusted from the front panel or under serial port or Ethernet port control. The default audio level is 0 dB.

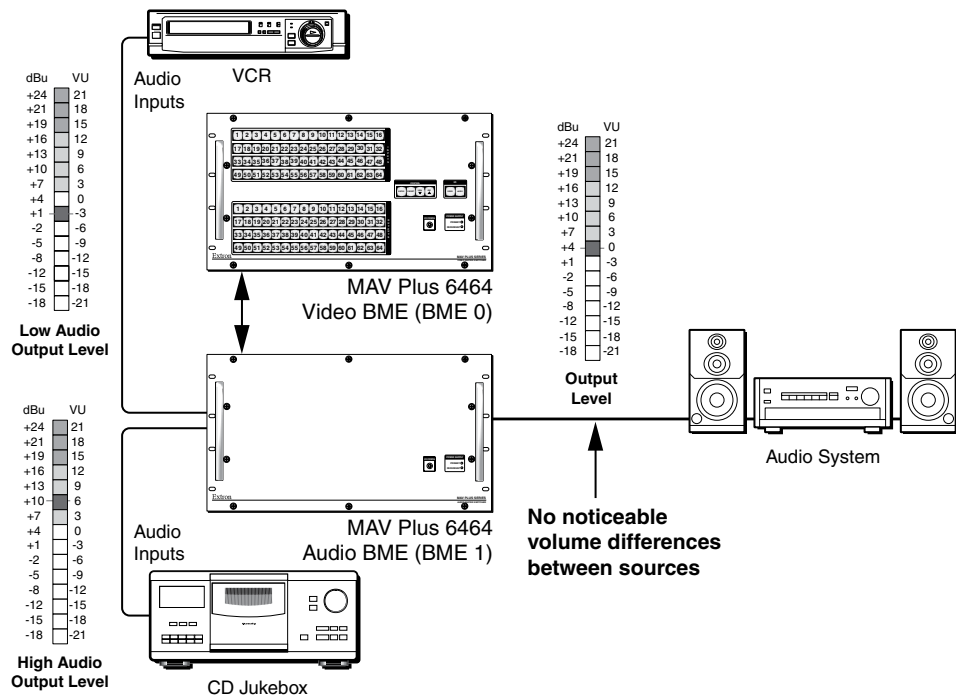


Figure 3-5 — Audio gain and attenuation

1. Press the Esc button to clear any front panel button indications that may be lit.
2. To enter *Audio* mode, press and **hold** the Audio button until the button starts blinking red, then release it.
3. Press and release an input button to select an input. The output buttons display the audio level and polarity (+ or -) for the selected input; each output button indicates 0.5 dB when flashing and 1 dB of gain or attenuation when lit. Green output buttons indicate a gain (+) audio level and red buttons indicate an attenuation (-) level.
4. Press and release the Esc (▲) and View (▼) buttons to increase and decrease the audio level.
5. Press and release the Audio button to exit the *Audio* mode. The Audio button stops blinking.

- NOTE**
- Pressing the Enter or Preset button also exits Audio mode. Pressing the Preset button changes to Recall Preset mode.
 - There is one audio level setting per input. The audio level setting is shared by the left and right audio inputs.
 - The audio level settings are stored in non-volatile memory. When power is removed and restored, the audio level settings are retained.

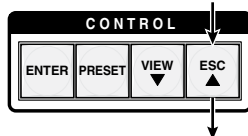
Operation, cont'd

Example 10: Viewing and adjusting an input audio level

In the following example, an audio level is viewed and adjusted. The steps show the front panel indications that result from your actions.

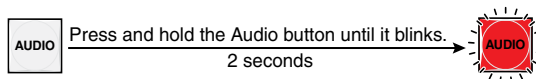
1. **Clear all selections:** Press and release the Esc button.

Press the Esc button to clear all selections.



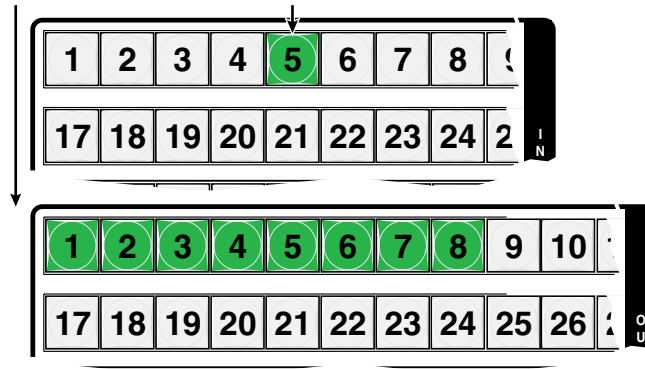
The button flashes once.

2. **Enter Audio mode:** Press and **hold** the Audio button for approximately 2 seconds until it blinks.



3. **Select an input:** Press and release the Input 5 button.

Press and release the Input 5 button.
The button lights green.



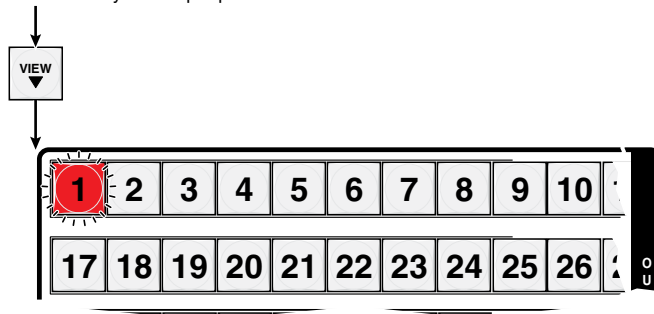
- The output buttons display the selected input's audio level and polarity (gain or attenuation).
- Each output button indicates 0.5 dB when flashing and 1 dB when lit steadily.
When the buttons are lit **green**, they indicate a **gain (+)** audio level.
When the output buttons are lit **red**, they indicate an **attenuation (-)** level.
- In this example, the output buttons display an audio gain level of +8 dB.

4. **Change the input level:** Press and release the View (▼) button once to decrease the input audio level by 0.5 dB.

Press and release the View (▼) button several more times to decrease the input audio level by 0.5 dB per button press. Note the output button indications that change each time the View (▼) button is pressed.

The figure below shows the result of pressing the View (▼) button a total of 17 times. Note that the level is now displayed in red to indicate a negative (attenuation) level.

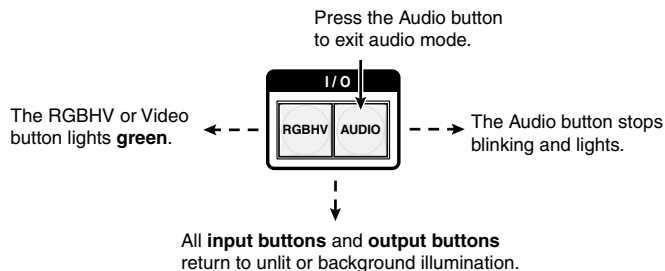
Press the View button to decrease the input audio level by 0.5 dB per push of the button.



- The output buttons display the selected input's audio level and polarity (gain or attenuation).
- Each output button indicates 0.5 dB when flashing and 1 dB when lit. When the buttons are lit **green**, they indicate a **gain (+)** audio level. When the output buttons are lit **red**, they indicate an **attenuation (-)** level.
- In this example, the output buttons display an audio attenuation level of -1 dB.

NOTE You can press and **hold** the Esc (▲) or View (▼) button to ramp the level up or down by 3 dB per second to the high or low limit.

5. **Exit Audio mode:** Press and release the Audio button.



Viewing and adjusting the output volume (systems with audio BMEs)

On MAV Plus audio BMEs, the audio level of each local output can be displayed and adjusted through a range of 100% (no attenuation) to 0% (maximum [76 dB] attenuation). The audio level can be adjusted from the front panel or under serial port or Ethernet control. The default volume is 100% (no attenuation).

NOTE *Output volume is protected when front panel Lock mode 2 is selected. You can view the volume in Lock mode 2 but you cannot adjust it from the front panel. See “Setting the front panel Locks (Executive modes)” on page 3-43.*

1. Press the Esc button to clear any front panel button indications that may be lit.
2. To enter *Audio* mode, press and **hold** the Audio button until the button starts blinking red, then release it.
3. Press and release an output button to select an output. The input buttons display the volume level for the selected output. As a general rule, the more buttons that are lit, the higher the volume. The fewer buttons that are lit, the lower the volume.

For a more detailed analysis of decoding the displayed value, see “Reading the displayed volume (audio models)” on the next page.

4. Press and release the Esc (▲) and View (▼) buttons to increase and decrease the audio volume.
5. Press and release the Audio button to save the audio settings and exit the *Audio* mode. The Audio button stops blinking.

- NOTE**
- *There is one audio volume level setting per local output. The audio level setting is shared by the left and right audio inputs.*
 - *The audio volume levels are stored in non-volatile memory. When power is removed and restored, the audio level settings are retained.*
 - *Exiting Audio mode by pressing the Audio button always returns the I/O buttons to RGBHV (CrossPoint) or Video (MAV Plus) lit green and Audio lit red.*
 - *Pressing the Enter or Preset button also exits Audio mode. Pressing the Preset button changes to Recall Preset mode.*

Reading the displayed volume

NOTE *This section is a detailed look at reading the output volume display on the switcher's front panel. If you do not need to read the exact value of the volume setting, skip this section.*

There is a maximum of 76 dB of volume attenuation available. The attenuation is adjustable in steps of 0.5 dB, except for the first step from full attenuation, which is 34.5 dB.

- **At maximum attenuation**, no input buttons are lit, 76 dB of attenuation is applied, and the audio output is effectively muted.
- **At no attenuation**, all input buttons are lit and the output volume is equal to the input signal plus any gain or attenuation that is applied to that specific input using the input audio level adjustment. See "Viewing and adjusting the input audio level (systems with audio BMEs)".

The input buttons blink or light sequentially to indicate the approximate volume of the selected output. Volume is defined as a percentage of the input audio signal that is applied to the output. From 0% of volume, the first Esc (▲) button push applies 4.75% of the input audio signal and the Input 1 button flashes. From 4.75% on, each Esc (▲) button push applies 0.75% more of the input audio signal to the output and the number of output buttons flashing or lit increases:

- **Push Esc (▲) button** — $4.75\% + 0.75\% = 5.5\%$ volume, indicated by the Input 1 button lit steadily.
- **Push Esc (▲) button three more times** — $5.5\% + 0.75\% + 0.75\% + 0.75\% = 7.75\%$ volume, indicated by the Input 1 and Input 2 buttons lit steadily and the Input 3 button flashing.
- **Push Esc (▲) button nineteen more times** — $7.75\% + (19 \times 0.75\%) = 22\%$ volume, indicated by the Input 1 through Input 12 buttons lit steadily.

When all input buttons are lit, the audio output is 100% of the audio input level.

































































































































Another way to view the volume level is to think in terms of the attenuation that is applied to the output. Attenuation is indicated by the lit or blinking input buttons: when fewer input buttons are lit, attenuation is greater (and the volume is quieter).


- At minimum volume, all input buttons are unlit or background illuminated and 76 dB of attenuation is applied to the output. The audio output is effectively muted.
- The first step of volume increase causes the Input 1 button to flash. Attenuation is reduced by 34.5 dB (63.5 dB of attenuation is applied to the output).
- The second step of volume increase reduces the attenuation by an additional 0.5 dB (62.5 dB of attenuation is applied to the output). (The Input 1 button lights steadily.)
- Successive steps of volume increase cause consecutive buttons to flash and then light. Each consecutive **lit** button indicates a full 1 dB of **attenuation reduction**.
- The buttons' volume indications are additive. **For example:** Input 1 lit ($[34.5 \text{ dB} + 0.5 \text{ dB}]$ of **attenuation reduction**) and Input 2 lit ($[0.5 \text{ dB} + 0.5 \text{ dB}]$ of **attenuation reduction**) indicate that the output **attenuation has been reduced** by a total of 36 dB: ($34.5 \text{ dB} + 0.5 \text{ dB} + 0.5 \text{ dB} + 0.5 \text{ dB} = 36 \text{ dB}$).
- At full volume, no attenuation is applied to the output and all input buttons are lit steadily.

See the table on the next page to read the volume display for each display scheme.

Operation, cont'd

Audio volume adjustment settings

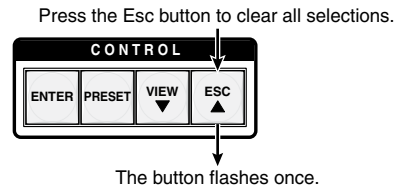
Highest # input button lit	dB of attenuation	Output volume	Highest # input button lit	dB of attenuation	Output volume	Highest # input button lit	dB of attenuation	Output volume	Highest # input button lit	dB of attenuation	Output volume
None	76	0%									
	63.5	4.75%		47.5	28.75%		31.5	52.75%		15.5	76.75%
	63	5.5%		47	29.5%		31	53.5%		15	77.5%
	62.5	6.25%		46.5	30.25%		30.5	54.25%		14.5	78.25%
	62	7%		46	31%		30	55%		14	79%
	61.5	7.75%		45.5	31.75%		29.5	55.75%		13.5	79.75%
	61	8.5%		45	32.5%		29	56.5%		13	80.5%
	60.5	9.25%		44.5	33.25%		28.5	57.25%		12.5	81.25%
	60	10%		44	34%		28	58%		12	82%
	59.5	10.75%		43.5	34.75%		27.5	58.75%		11.5	82.75%
	59	11.5%		43	35.5%		27	59.5%		11	83.5%
	58.5	12.25%		42.5	36.25%		26.5	60.25%		10.5	84.25%
	58	13%		42	37%		26	61%		10	85%
	57.5	13.75%		41.5	37.75%		25.5	61.75%		9.5	85.75%
	57	14.5%		41	38.5%		25	62.5%		9	86.5%
	56.5	15.25%		40.5	39.25%		24.5	63.25%		8.5	87.25%
	56	16%		40	40%		24	64%		8	88%
	55.5	16.75%		39.5	40.75%		23.5	64.75%		7.5	88.75%
	55	17.5%		39	41.5%		23	65.5%		7	89.5%
	54.5	18.25%		38.5	42.25%		22.5	66.25%		6.5	90.25%
	54	19%		38	43%		22	67%		6	91%
	53.5	19.75%		37.5	43.75%		21.5	67.75%		5.5	91.75%
	53	20.5%		37	44.5%		21	68.5%		5	92.5%
	52.5	21.25%		36.5	45.25%		20.5	69.25%		4.5	93.25%
	52	22%		36	46%		20	70%		4	94%
	51.5	22.75 %		35.5	46.75%		19.5	70.75%		3.5	94.75%
	51	23.5%		35	47.5%		19	71.5%		3	95.5%
	50.5	24.25%		34.5	48.25%		18.5	72.25%		2.5	96.25%
	50	25%		34	49%		18	73%		2	97%
	49.5	25.75%		33.5	49.75%		17.5	73.75%		1.5	97.75%
	49	26.5%		33	50.5%		17	74.5%		1	98.5%
	48.5	27.25%		32.5	51.25%		16.5	75.25%		0.5	99.25%
	48	28%		32	52%		16	76%		0	100%

 = blinking LED

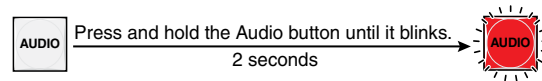
Example 11: Viewing and adjusting an output volume level

In the following example, the audio output volume is viewed and adjusted. The steps show the front panel indications that result from your actions. See the table on the previous page.

1. **Clear all selections:** Press and release the Esc button.

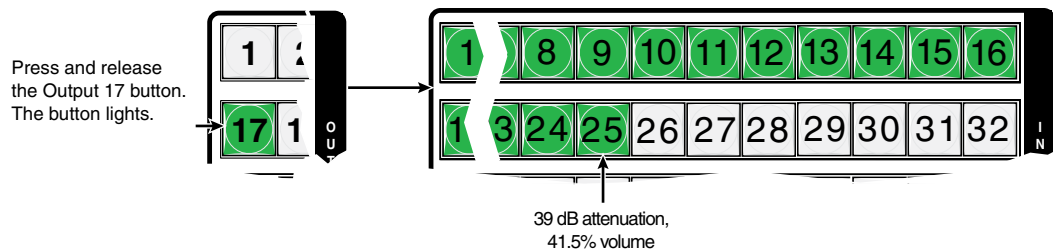


2. **Enter Audio mode:** Press and **hold** the Audio button for approximately 2 seconds until it blinks.



3. **Select an output:** Press and release the Output 1 button.

The input buttons display the selected output's audio volume level.
Each lit input button beyond input 1 indicates 1.5 percent of the total input volume is applied to the output.
In this example, the **lit** input buttons indicate 41.5 percent of the applied audio input. The **unlit** input buttons indicate an audio volume **attenuation** of 39 dB.



NOTE Volume is protected when front panel Lock mode 2 is selected. You can view the volume in Lock mode 2 but you cannot change it from the front panel. See “Setting the front panel Locks (Executive modes)” on page 3-43.

If front panel Lock mode 2 is selected and you try to perform step 4, the actions are ignored and the Enter, Video, and Audio buttons flash.

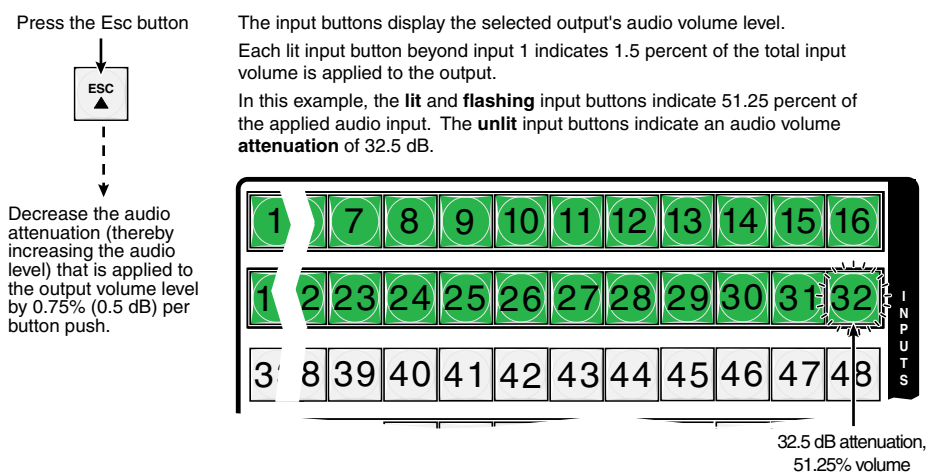
Operation, cont'd

4. **Change the volume:** Press and release the Esc (▲) button once to increase the volume by 1.5%.

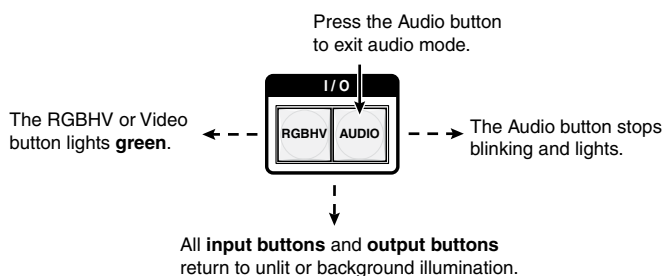
Press and release the Esc (▲) button several more times to increase the volume by 1.5% per button press. Note the input button indication changes that occur each time the Esc (▲) button is pressed and released.

NOTE You can press and **hold** the Esc (▲) or View (▼) button to ramp the level up or down by 3 dB per second to the high or low limit.

The figure below show the result of pressing the Esc (▲) button a total of 13 times from the volume displayed after step 3.



5. **Exit Audio mode:** Press and release the Audio button.



Setting the front panel locks (*Executive modes*)

NOTE *In a system with multiple front panel controllers, Extron recommends locking (setting Lock mode 1) the front panel of BMEs other than BME 0 to prevent confusion.*

The front panel security lockout limits the operation of the switcher system from the front panel controller. When the switcher is locked, all of the front panel functions are disabled except for the View-Only mode functions (see "Viewing a configuration" on page 3-20). Other than in *View-Only* mode, if the user pushes a front panel button when the switcher is locked, the RGBHV (CrossPoint 450 Plus) or Video (MAV Plus) button and the Audio button flash twice and return to their previous state.

- **Lock mode 0** — The front panel is completely unlocked. All front panel functions are available.
- **Lock mode 1** — All changes are locked from the front panel (except for setting *Lock mode 2*). Some functions can be viewed.
- **Lock mode 2** — Basic functions are unlocked. Advanced features are locked and can be viewed only.

Basic features consist of:

- Making ties
- Saving and recalling presets
- Setting input audio gain and attenuation
- Changing *Lock modes*

Advanced features consist of:

- Creating I/O groups
- Setting RGB delay
- Setting video and audio output mutes
- Setting audio output volume
- Setting the rear panel RS-232/RS-422 port protocol and baud rate

NOTE *The switcher is shipped from the factory in Lock mode 2.*

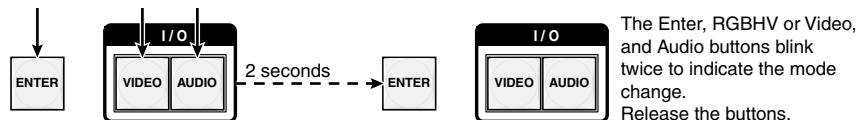
Selecting **Lock mode 2** or toggling between mode 2 and mode 0

NOTE *If the switcher is in Lock mode 0 or mode 1, this procedure selects mode 2.*

If the switcher is in Lock mode 2, this procedure selects mode 0 (unlocks the switcher).

Change the *Lock mode* as shown:

Press and **hold** the Enter, RGBHV or Video, and Audio buttons simultaneously to turn on Lock mode 2 or to toggle between mode 2 and mode 0.



Operation, cont'd

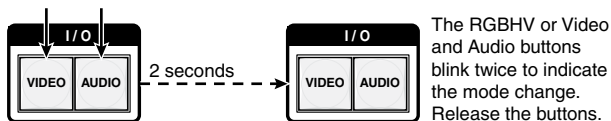
Selecting **Lock mode 2** or toggling between **mode 2** and **mode 1**

NOTE If the switcher is in Lock mode 0 or mode 1, this procedure selects mode 2.

If the switcher is in Lock mode 2, this procedure selects mode 1.

Change the *Lock* mode as shown:

Press and **hold** the RGBHV or Video and Audio buttons simultaneously to turn on Lock mode 2 or to toggle between mode 1 and mode 2.



Performing a system reset from the front panel

The front panel reset is identical to the `[Esc]ZXXX←` SIS command (see chapter 4, “Programmer’s Guide”). A system reset performs the following functions:

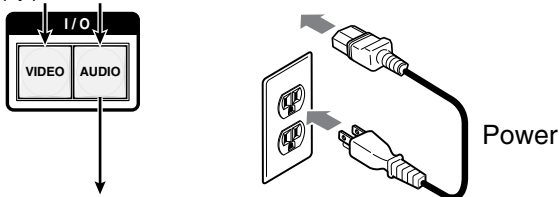
- Clears all ties and presets.
- Clears all video and audio mutes.
- Resets all I/O grouping.
- Resets all RGB delay to 0 seconds.
- Resets all input audio levels to unity gain (0 dB).
- Sets all output volume levels to 100% (0 dB of attenuation).

NOTE The system reset clears most image and audio adjustments. If you want to save these settings, use the Windows-based Matrix Switchers Control Program and the **File > Save MATRIX settings as...** selection before you perform this reset (See chapter 5, “Matrix Software”).

Reset the switcher to the factory default settings by pressing and **holding** the RGBHV (CrossPoint 450 Plus) or Video (MAV Plus) button and the Audio button **while** you apply AC power to the switcher.

NOTE System reset does not reset the Internet protocol (IP) settings or replace user-installed firmware.

Press and **hold** the RGBHV or Video and Audio buttons while you apply power to the switcher.



The switcher flashes the button indicators **red, green, red,** and **amber** and then turns them off.

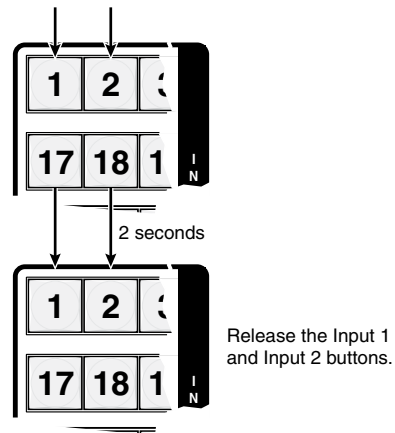
Continue to hold the RGBHV or Video and Audio buttons until all input and output buttons return to either unlit or to background illumination and the RGBHV or Video and Audio buttons turn on.

Release the RGBHV or Video and Audio buttons.

Background illumination

The buttons on the front panel can be set to provide amber background illumination at all times or the background illumination can be turned off. To toggle the background illumination on or off, press and hold the Input 1 and Input 2 buttons simultaneously for approximately 2 seconds.

Press and **hold** the Input 1 and Input 2 buttons simultaneously to toggle background illumination mode on or off.



Selecting the rear panel Remote port protocol and baud rate

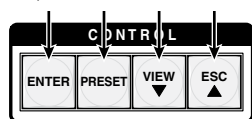
NOTE The rear panel Remote port protocol and baud rate are protected when front panel Lock mode 2 is selected. You cannot select Serial Port Selection and Configuration mode. See "Setting the front panel Locks (Executive modes)" on page 3-43.

The switcher's rear panel Remote port can support either RS-232 or RS-422 serial communication protocol, and can operate at 9600, 19200, 38400, and 115200 baud rates. The settings of these variables can be viewed and changed from the front panel.

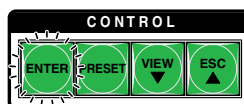
View and configure the switcher's serial communications settings as follows:

1. **Select Serial Port Selection and Configuration mode:** Simultaneously press and hold all Control buttons (Enter, Preset, View, and Esc).

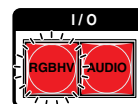
Press and hold the Enter, Preset, View, and Esc buttons.



2 seconds



- All Control buttons light with one flashing.



- Both I/O buttons light with one flashing.

The flashing Control button indicates the **baud rate** as follows:

Enter — 9600	Preset — 19200
View — 38400	Esc — 115200

The flashing I/O button indicates the **protocol** as follows:
RGBHV/Video — RS-232 Audio — RS-422/RS-485

In this example, the port is set to RS-232 at 9600 baud.

2. Release the Control buttons.
3. **Change a value:** Press and release the button that relates to the desired value.

Press and release the button(s) to configure the port as follows:

Baud rate:

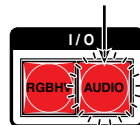
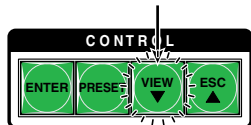
Enter — 9600	Preset — 19200
View — 38400	Esc — 115200

Serial protocol:

RGBHV/Video — RS-232	Audio — RS-422/RS-485
----------------------	-----------------------

The selected buttons blink and the others remain lit.

In this example, the port is set to RS-422 at 38400 baud.

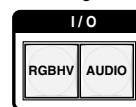
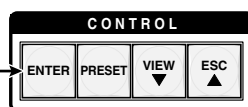


4. **Exit Serial Port Selection and Configuration mode:** Press and release an input or output button.

Press and release an input or output button.



All Control and I/O buttons return to unlit or background illumination.



Rear Panel Operations

The rear panel has a Reset button that initiates four levels of resets (numbered 1, 3, 4, and 5 for the sake of comparison with an Extron IPL product). The Reset button is recessed, so use a pointed stylus, ballpoint pen, or small screwdriver to access it.

See the following table for a summary of the modes.

CAUTION Review the reset modes carefully. Using the wrong reset mode may result in unintended loss of flash memory programming, port reassignment, or a controller reboot.

NOTE The reset modes listed below close all open IP and Telnet connections and close all sockets. Also, the following modes are separate functions, not a continuation from mode 1 to mode 5.

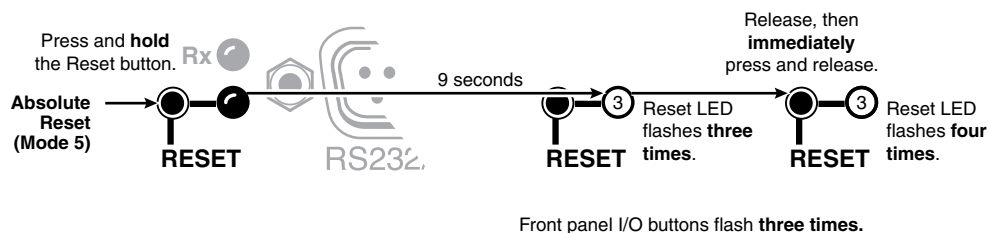
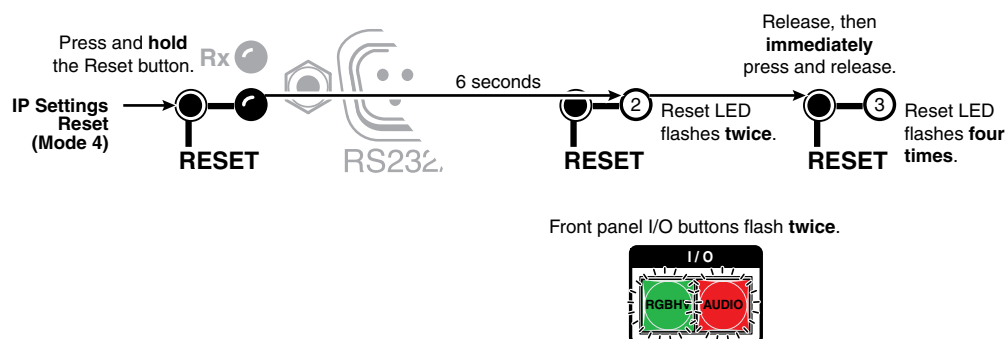
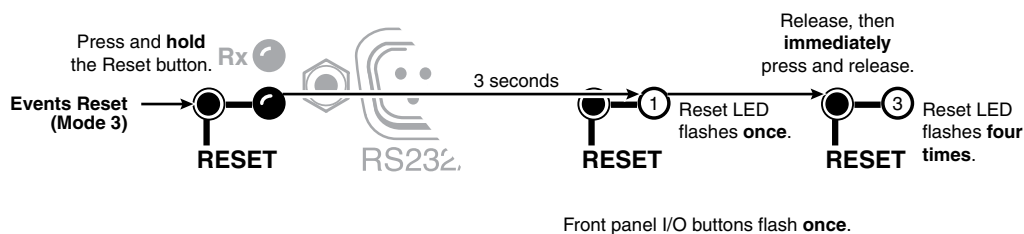
Reset Mode Comparison/Summary			
Mode	Activation	Result	Purpose/Notes
1	Hold down the recessed Reset button while applying power to the switcher. NOTE After a mode 1 reset is performed, update the switcher's firmware to the latest version. Do not operate the switcher firmware version that results from the mode 1 reset. If you want to use the factory default firmware, you must upload that version again. See chapter 5, "Matrix Software", for details on uploading firmware.	The switcher reverts to the factory default firmware. Event scripting does not start if the switcher is powered on in this mode. All user files and settings, such as IP settings, are maintained. NOTE If you do not want to update firmware, or if you performed a mode 1 reset by mistake, cycle power to the switcher to return to the firmware version that was running before the mode 1 reset. Use the 0Q SIS command to confirm that the factory default firmware is no longer running (look for the asterisk [*] following the version number.	Use mode 1 to revert to the factory default firmware version if incompatibility issues arise with user-loaded firmware.
3	Hold down the Reset button for about 3 seconds, until the Reset LED blinks once, then press Reset momentarily (<1 second) within 1 second.	Mode 3 turns events on or off. During resetting, the Reset LED flashes two times if events are starting, three times if events are stopping.	Mode 3 is useful for troubleshooting.
4	Hold down the Reset button for about 6 seconds, until the Reset LED blinks twice (once at 3 seconds and again at 6 seconds). Then press Reset momentarily (<1 second) within 1 second.	Mode 4: <ul style="list-style-type: none">• Enables ARP capability.• Sets the IP address to the factory default.• Sets the subnet address to the factory default.• Sets the gateway address to the factory default.• Sets port mapping to the factory default.• Turns DHCP off.• Turn events off. The Reset LED flashes four times in quick succession during the reset.	Mode 4 enables you to set IP address information using ARP and the MAC address.
5	Hold down the Reset button for about 9 seconds, until the Reset LED blinks three times (once at 3 seconds, again at 6 seconds, and then again at 9 seconds). Then press Reset momentarily (<1 second) within 1 second.	Mode 5 performs a complete reset to factory defaults (with the exception of the firmware): <ul style="list-style-type: none">• Does everything mode 4 does.• Resets most settings including:<ul style="list-style-type: none">Clears all ties and presets.Clears all output mutes.Clears all I/O grouping.• Resets all IP options.• Removes/clears all files for the switcher. The reset LED flashes four times in quick succession during the reset.	Mode 5 is useful if you want to start over with configuration and uploading or to replace events. Same as Esc ZQQQ← SIS command, see chapter 4, "Programmer's Guide".

For different reset levels, press and hold the button while the switcher is running or press and hold the button while you apply power to the switcher.

Performing soft system resets (reset modes 3, 4, and 5)

Perform a soft reset of the switcher as follows:

1. Use an Extron Tweeker or other small screwdriver to press and **hold** the rear panel Reset button until the rear panel Reset LED and the front panel View and Esc buttons blink once (events reset), twice (system reset), or three times (absolute reset).



2. Release the Reset button and then immediately press and release the Reset button again. Nothing happens if the second momentary press does not occur within 1 second.

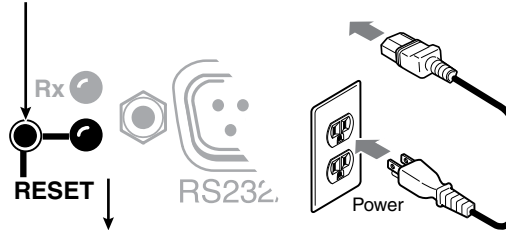
Performing a hard reset (reset mode 1)

The hard reset function restores the switcher to the base firmware that it was shipped with. After a hard reset, events do not automatically start, but user settings and files are restored. Perform a hard reset as follows:

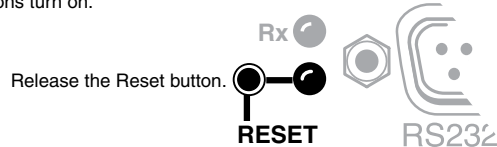
NOTE *The hard reset restores the factory-installed firmware. The switcher reverts to that factory firmware the next time power is cycled off and on unless a firmware update is performed before the power cycle.*

1. If necessary, turn off power to the switcher.
2. Press and **hold** the Reset button on the rear panel **while** you apply AC power to the switcher.

Press and **hold** the Reset button while you apply power to the switcher.



The switcher flashes the front panel button indicators **red, green, red, and amber** and then turns them off. Continue to hold the Reset button until all input and output buttons return to either unlit or to background illumination and the RGBHV or Video and Audio buttons turn on.



Optimizing the Audio (Systems with Audio BMEs)

Each individual input audio level can be adjusted within a range of -18 dB to +24 dB, so that there are no noticeable volume differences between sources and for the best headroom and signal-to-noise ratio. Each output's volume can be adjusted from fully attenuated (muted) to full volume. Adjust the input audio gain and attenuation and output volume as follows:

1. Connect audio sources to all desired inputs and connect the audio outputs to output devices such as audio players. See "Audio input and output (systems with audio BMEs)", in chapter 2, "Installation". For best results, wire all of the inputs and the outputs balanced.
2. Power on the audio sources, the switcher, and the audio players.
3. Switch among the inputs (see "Creating a configuration", earlier in this chapter), listening to the audio with a critical ear or measuring the output audio level with test equipment, such as a VU meter.
4. As necessary, adjust the input audio level of each input (see "Viewing and adjusting the input audio level (systems with audio BMEs)", earlier in this chapter) so that the approximate output level is the same for all selected inputs.
5. As necessary, adjust the output audio level of each input (see "Viewing and adjusting the output volume (systems with audio BMEs)", earlier in this chapter).

Troubleshooting

General checks

This section gives recommendations on what to do if you have problems operating the switcher.

1. Ensure that all devices are plugged in and powered on. The switcher is receiving power if one of the front panel Power Supply LEDs is lit green.
2. Check to see if one or more outputs are muted.
3. Ensure an active input is selected for output on the switcher.
4. Ensure that the proper signal format is supplied.
5. Check the cabling and make corrections as necessary.
6. Call the Extron S³ Sales & Technical Support Hotline if necessary. See the rear cover of this manual for the phone number in your region of the world

Plasma display S-video problem (CrossPoint 450 Plus wideband BMEs only)

Extron has encountered a problem that can occur when a CrossPoint 450 Plus wideband switcher BME routes S-video that is output by some video conference codecs. Some codecs change the DC offset on the chrominance (C) so that it is very different from the level on the luminance (Y). This can cause a plasma display to come up in the wrong size mode.

With the matrix switcher taken out of the system, the plasma works fine. It looks like a problem with the matrix switcher, but **it is not**. The matrix switcher boosts the bad codec output, which makes the plasma go to the wrong setting.

Solution: Try placing an Extron video DC block adapter, part #26-495-01, on the luminance (Y) input to the switcher from the codec.

Configuration Worksheets

Rather than trying to remember the configuration for each preset, use worksheets to record this information. Make copies of the blank worksheet on page 3-55 and use one for each preset configuration. Cross out all unused or inactive inputs and outputs. The worksheet accommodates all of the matrix sizes available with the CrossPoint 450 Plus and MAV Plus models documented in this manual. Cross out all unused or inactive inputs and outputs. Use different colors for video and audio.

Worksheet example 1: System equipment

Figure 3-6 shows a worksheet for a switcher configured as a 48-input by 32-output matrix in a fictional organization with the system hardware annotated. Inputs 10 and 11 have no connections in this organization, so they have been crossed out on the worksheet. Inputs 49 through 64 do not exist on this model, so they are crossed out. Similarly, outputs 7, 14, 15, 16, and 33 through 64 are crossed out on the worksheet.

Inputs include PCs, an audio CD player, cameras, and an Extron VTG 400D. Output devices include monitors, front and rear projectors, a stereo, and a VCR for recording presentations.

The VTG 400D video test generator connected to input 12 enables a video test pattern to be sent to one, several, or all output devices for problem isolation or adjustment purposes. An audio test tape or CD could be used in a similar manner to check the audio components.

Input sources															
Camera main podium	Camera #2	Podium mic	Laptop RGB 201	Audio CD	Classrm #1 VCR DVS 406	Classrm #2 VCR DVS 406	PC1 RGB 201	Rack DVD (DVS)	X	X	VTG 400	Floorbox #1-1	Floorbox #1-2	Floorbox #1-3	Floorbox #1-4
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Floorbox #2-1	Floorbox #2-2	Floorbox #2-3	Floorbox #2-4	Demo rk #1 USP 405	Demo rk #2 USP 405	Demo rk #3 USP 405	Demo rk #4 USP 405	X	Floorbox #3-1	Floorbox #3-2	Floorbox #3-3	Floorbox #3-4	X	Floorbox #4-1	Floorbox #4-2
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Floorbox #4-3	Floorbox #4-4	X	Floorbox #5-1	Floorbox #5-2	Floorbox #5-3	Floorbox #5-4	X	Demo rk #5 USP 405	Demo rk #6 USP 405	Demo rk #7 USP 405	Demo rk #8 USP 405	X	X	X	X
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Main hall PJ#1	Main hall PJ#2	Podium monitor	Conf. room	Sound system #2	VCR (USP 405)	X	Lobby monitor	Class room #1 monitor	Class room #2 monitor	Demo room PJ#1	Demo rack monitor	Demo rack switcher	X	X	X
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Demo wallbox #1-1	Demo wallbox #1-2	Demo wallbox #2-1	Demo wallbox #2-2	Demo wallbox #3-1	Demo wallbox #3-2	Demo wallbox #4-1	Demo wallbox #4-2	Demo wallbox #5-1	Demo wallbox #5-2	Demo wallbox #6-1	Demo wallbox #6-2	Demo wallbox #7-1	Demo wallbox #7-2	Demo wallbox #8-1	Demo wallbox #8-2
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Output destinations

Preset # _____ Title: _____ Video: _____ Audio: _____

Fill in the preset number and use colors, or dashes, etc. to make connecting lines. Indicate if the configuration is for Video, Audio, or both.

Figure 3-6 — Worksheet example 1: System equipment

Operation, cont'd

Worksheet example 2: Daily configuration

Figure 3-7 continues from worksheet example 1 by showing the ties that make up the configuration of preset 1. Black lines shows one configuration, green lines a second configuration, and red lines a third configuration.

In this example:

- The image of the presenter, from the main podium camera (input 1), is:
 - Displayed in the main hall (output 1)
 - Displayed in the conference room (output 4) to the overflow crowd
 - Displayed in the lobby (output 8)
 - Tied to the VCR (output 6)
- The presenter's microphone (input 3) is routed to the main hall, conference room, and a VCR (outputs 1, 4, and 6):
- The presenter has a presentation on her laptop computer (input 4) that is:
 - Displayed in the main hall (output 2)
 - Displayed locally on the podium (output 3)
- Music from the CD player (input 5) is:
 - Played in the background in the main hall on sound system #2 (output 5)
 - Played in the lobby (output 8)

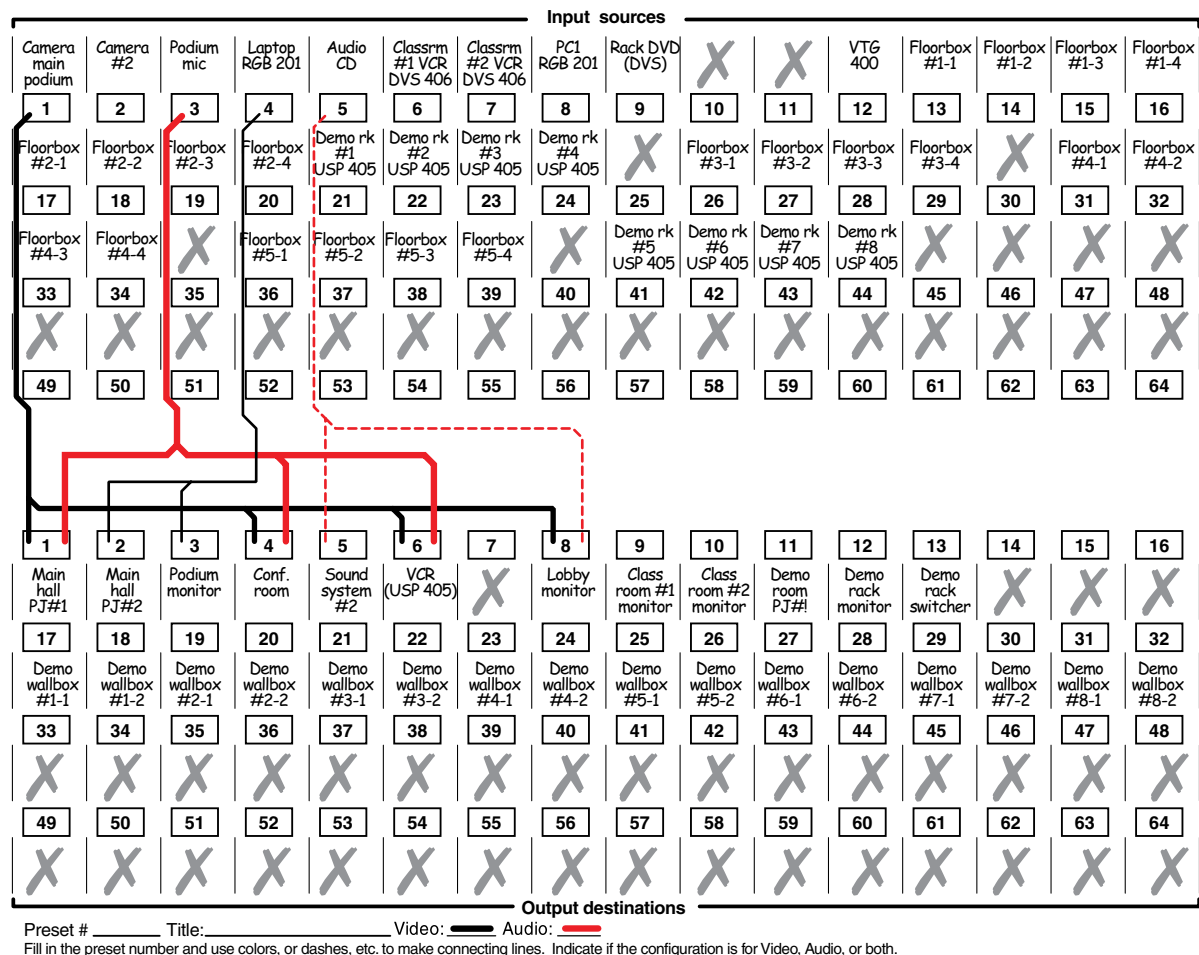


Figure 3-7 — Worksheet example 2: Daily configuration

Worksheet example 3: Test configuration

The A/V system in our fictional organization needs to be fine tuned on a regular basis. Figure 3-8 shows a typical test configuration, with an Extron video test generator (input 12) generating a test pattern to all outputs that have connected monitors and wall boxes. An audio CD (input 5) is used for evaluating the audio outputs.

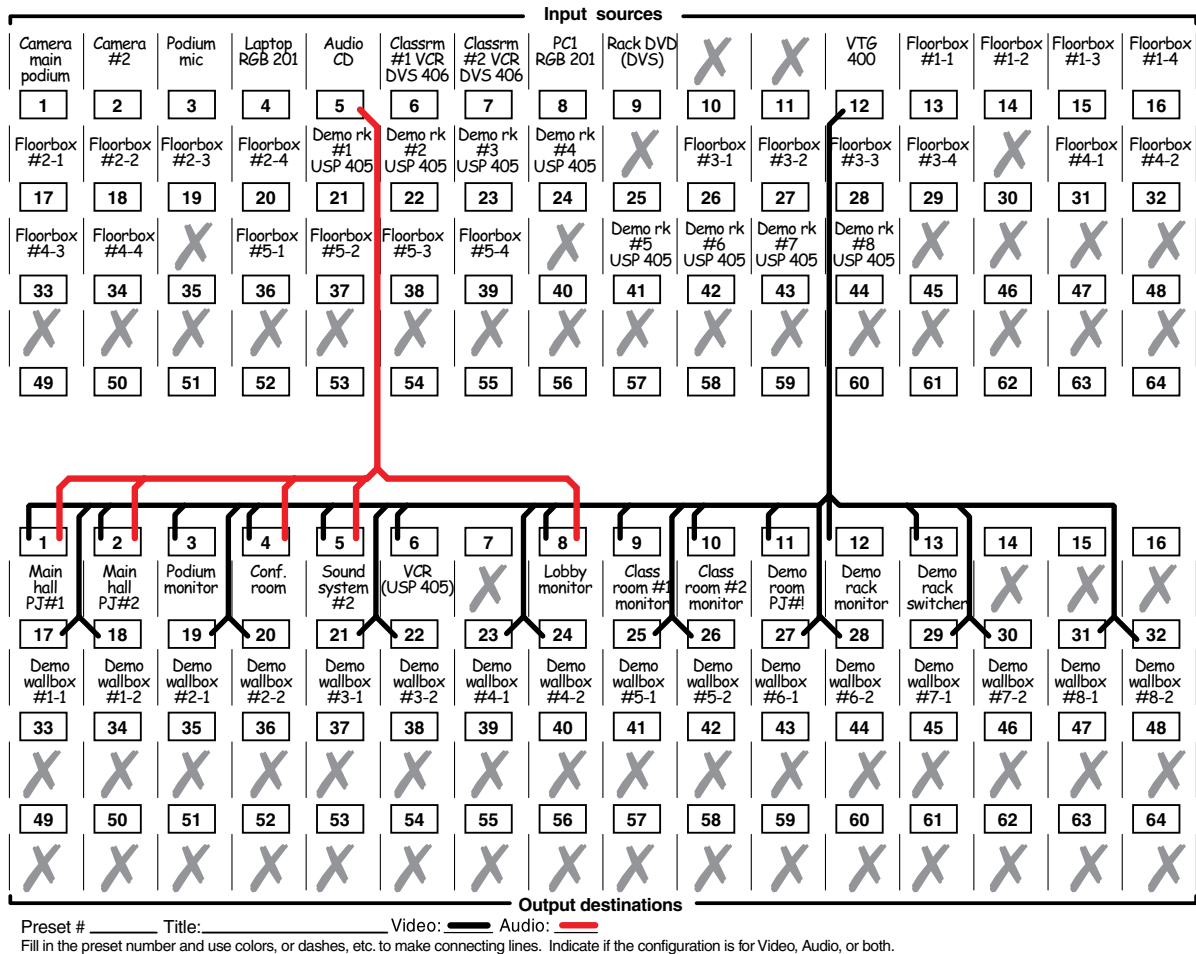


Figure 3-8 — Worksheet example 3: Test configuration

Operation, cont'd

Input sources

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64

Output destinations

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64

Preset # _____ Title: _____ Video: _____ Audio: _____

Fill in the preset number and use colors, or dashes, etc. to make connecting lines. Indicate if the configuration is for Video, Audio, or both.

Blank configuration worksheet

Operation, cont'd



CrossPoint 450 Plus and MAV Plus Switchers

4

Chapter Four

Programmer's Guide

Serial Ports

Ethernet (LAN) Port

Host-to-Switcher Instructions

Switcher-Initiated Messages

Switcher Error Responses

Using the Command/Response Tables

Special Characters

Programmer's Guide

Serial Ports

The switcher's BME 0 has two serial ports that can be connected to a host device such as a computer running the HyperTerminal utility, an RS-232 capable PDA, or a control system. These ports make serial control of the switcher possible. The serial ports are:

- The rear panel Remote RS-232/RS-422 port, a 9-pin D female connector
- The front panel Configuration (RS-232) port, a 2.5 mm mini stereo jack

The default protocol for both ports is as follows:

- 9600 baud
- no parity
- 8 data bits
- 1 stop bit
- no flow control

The ports can be configured to operate at the 9600, 19200, 38400, or 115200 baud rate.

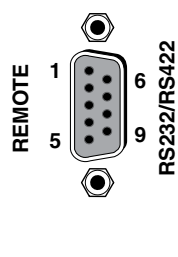
NOTE These two ports are independent of one another. A front panel Configuration port connection and a rear panel Remote port connection can both be active at the same time.

NOTE The switcher can operate at 9600, 19200, 38400, or 115200 baud rates, but Extron recommends leaving these ports at 9600 baud only.

NOTE Serial ports on BMEs other than BME 0 should not be used.

Rear panel Remote port

NOTE The rear panel Remote RS-232/RS-422 port can be configured from the front panel or using Simple Instruction Set (SIS) commands. See "Selecting the rear panel Remote port protocol and baud rate" in chapter 3, "Operation", to configure the port from the front panel. See the "Command/Response table for IP-Specific SIS commands", on page 4-23, to configure the port using an SIS command.



Pin	RS-232	Function	RS-422	Function
1	—	Not used	—	Not used
2	TX	Transmit data	TX-	Transmit data (-)
3	RX	Receive data	RX-	Receive data (-)
4	—	Not used	—	Not used
5	Gnd	Signal ground	Gnd	Signal ground
6	—	Not used	—	Not used
7	—	Not used	RX+	Receive data (+)
8	—	Not used	TX+	Transmit data (+)
9	—	Not used	—	Not used

Figure 4-1 — Remote connector pin assignments

Front panel Configuration port

The front panel Configuration port is hard configured as RS-232 only. The port can operate at the 9600, 19200, 38400, or 115200 baud rate, **but Extron recommends leaving this port at 9600 baud only.**

NOTE *This port is independent of the rear panel Remote port and is not affected by changes to the rear panel port's protocol. This front panel port's protocol can be changed via an SIS command only. See the "Command/Response table for IP-Specific SIS commands", on page 4-23, to configure both ports using an SIS command.*

The optional 9-pin D to 2.5 mm mini jack TRS RS-232 cable, part #70-335-01 can be used for connection to the Configuration port.

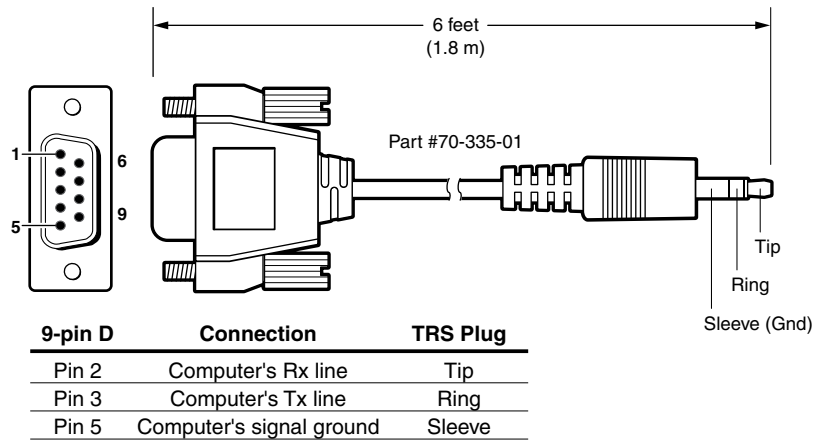


Figure 4-2 — Optional 9-pin TRS RS-232 cable

Ethernet (LAN) Port

The rear panel Ethernet connector on the switcher can be connected to an Ethernet LAN or WAN. Communication between the switcher and the controlling device is via telnet (a TCP socket using port 23). The TCP port can be changed if necessary, via SIS. This connection makes SIS control of the switcher possible using a computer connected to the same LAN or WAN. The SIS commands and the actions of the switcher are identical to the commands and actions the switcher has when the computer is communicating with it via a serial port.

Ethernet connection

The Ethernet cable can be terminated as a straight-through cable or a crossover cable and must be properly terminated for your application (figure 4-3).

- **Crossover cable** — Direct connection between the computer and the CrossPoint 450 Plus or MAV Plus switcher
- **Patch (straight-through) cable** — CrossPoint 450 Plus or MAV Plus switcher to an Ethernet LAN

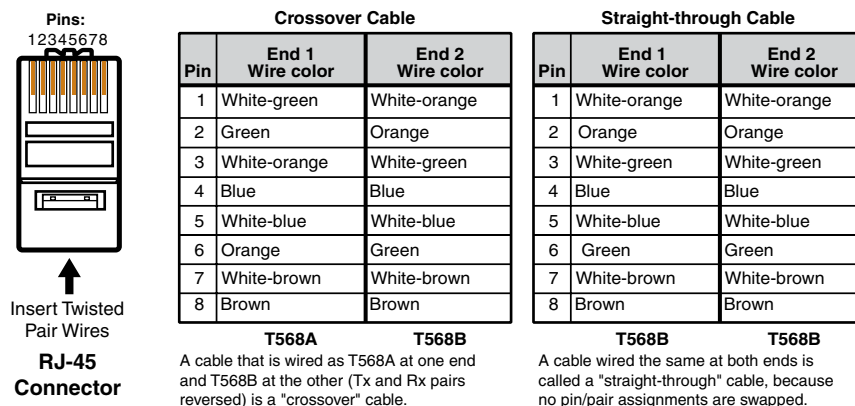


Figure 4-3 — RJ-45 Ethernet connector pin assignments

Default IP addresses

To access the CrossPoint 450 Plus or MAV Plus switcher via the LAN port, you need the Extron IP address, and may need the subnet mask and the gateway address. If the IP address has been changed to an address comprised of words and characters, you can determine the actual numeric IP address using the ping (ICMP) utility (see appendix A, "Ethernet Connection", for more details). If the addresses have not been changed, the factory-specified defaults are:

- IP address: 192.168.254.254
- Subnet mask: 255.255.0.0
- Gateway address: 0.0.0.0
- DHCP: off

Establishing a connection

Establish a network connection to a CrossPoint 450 Plus or MAV Plus switcher as follows:

1. Open a TCP socket to port 23 using the switcher's IP address.

NOTE *If the local system administrators have not changed the value, the factory-specified default, 192.168.254.254, is the correct value for this field.*

The switcher responds with a copyright message that includes the copyright year, product name, firmware version, part number, and the current date and time.

NOTE *If the switcher is not password-protected, the device is ready to accept SIS commands immediately after it sends the copyright message.*

NOTE *If the switcher is password-protected, a password prompt appears below the copyright message.*

2. If the switcher is password protected, enter the appropriate administrator or user password.

If the password is accepted, the switcher responds with *Login User* or *Login Administrator*.

If the password is not accepted, the *Password* prompt reappears.

Connection Timeouts

The LAN port times out after a designated period of time of no communications. By default, this timeout value is set to 5 minutes but the value can be changed. See the "Set current port timeout" SIS commands on page 4-23.

NOTE *Extron recommends leaving the default timeout at 5 minutes and periodically issuing the Query (Q) command to keep the connection active. If there are long idle periods, Extron recommends disconnecting the socket and reopening the connection when another command must be sent.*

Number of connections

A CrossPoint 450 Plus or MAV Plus switcher can have up to 200 simultaneous TCP connections, including all HTTP sockets and telnet connections. When the connection limit is reached, the switcher accepts no new connections until some have been closed.

No error message or indication is given that the connection limit has been reached. To maximize performance of an IP Link device, keep the number of connections low and close unnecessary open sockets.

Using Verbose Mode

Telnet connections to a CrossPoint 450 Plus or MAV Plus switcher can be used to monitor for changes that occur on the switcher, such as front panel operations and SIS commands from other telnet sockets or a serial port. For a telnet session to receive change notices from the switcher, the telnet session must be in verbose mode 3. See the "Set Verbose Mode" SIS command on page 4-23. In verbose mode 3, the telnet socket reports changes in messages that resemble SIS command responses.

Host-to-Switcher Instructions

The switcher accepts SIS (Simple Instruction Set) commands through either serial port and the LAN port. SIS commands consist of one or more characters per command field. They do not require any special characters to begin or end the command character sequence. Each switcher response to an SIS command ends with a carriage return and a line feed (CR/LF = **↵**), which signals the end of the response character string. A string is one or more characters.

Switcher-Initiated Messages

When the connection is via a serial port or the switcher is in verbose mode 2 or 3, and a local event such as a front panel operation occurs, the switcher responds by sending a message to the host. The switcher-initiated messages are listed below (underlined).

(c) Copyright 2009, Extron Electronics, CP 450 MAV Plus, Vx.xx, 60-*nnnn-nn*
{day, date, time}**↵**

The switcher initiates the copyright message when it is first powered on or when connection via Internet protocol (IP) is established. Vx.xx is the firmware version number. *nn-nnn-nn* is BME 0's part number. *day, date, time* is the date and time of the connection and is reported only when the connection is made via the LAN port.

↵Password**↵**

The switcher initiates the password message immediately after the copyright message when the controlling system is connected using TCP/IP or telnet and the switcher is password protected. This message means that the switcher requires an administrator or user level password before it will perform the commands entered via this link. The switcher repeats the password message response for every entry other than a valid password until a valid password is entered.

↵Login Administrator**↵**

↵Login User**↵**

The switcher initiates the login message when a correct administrator or user password has been entered. If the user and administrator passwords are the same, the switcher defaults to administrator privileges.

Qik**↵**

The switcher initiates the Qik message when a front panel switching operation has occurred.

Sprnn**↵**

The switcher initiates the Spr message when a memory preset has been saved from the front panel. *nn* is the preset number.

Rprnn**↵**

The switcher initiates the Rpr message when a memory preset has been recalled from the front panel. *nn* is the preset number.

Innn•Audxx**↵**

The switcher initiates the Aud message when a front panel input audio level change has occurred. "*nn*" is the input number, • is a space, and "*xx*" is the dB level.

Outnn•Volxx**↵**

The switcher initiates the Vol message when a front panel output audio volume change has occurred. "*nn*" is the output number, • is a space, and "*xx*" is the volume level.

Vmtnn•x

The switcher initiates the Vmt message when a channel output mute is toggled on or off from the front panel. *nn* is the output number, • is a space, and *x* is the mute status: 1 = on, 0 = off.

Amtnn•x

The switcher initiates the Amt message when an audio output mute is toggled on or off from the front panel. "*nn*" is the output number, • is a space, and "*x*" is the mute status: 1 = on, 0 = off.

Exen

The switcher initiates the Exe message when executive mode is toggled on or off from the front panel. *n* is the executive mode: 0, 1, or 2.

Switcher Error Responses

When the switcher receives an SIS command and determines that it is valid, it performs the command and sends a response to the host device. If the switcher is unable to perform the command because the command is invalid or contains invalid parameters, the switcher returns an error response to the host. The error response codes are:

- E01 — Invalid input channel number (too large)
- E10 — Invalid command
- E11 — Invalid preset number
- E12 — Invalid output number (too large)
- E13 — Invalid value (out of range)
- E14 — Illegal command for this configuration
- E17 — Timeout (caused only by direct write of global presets)
- E21 — Invalid room number
- E24 — Privilege violation (Ethernet, Extron software only)

Using the Command/Response Tables

The command/response tables begin on page 4-9. Lower-case letters are acceptable in the command field except where indicated for the gain and attenuation commands. The table below shows the hexadecimal equivalent of each ASCII character used in the command/response table.

ASCII to HEX Conversion Table																Esc 1B	CR 0D	LF 0A
Space 20	!	21	"	22	#	23	\$	24	%	25	&	26	'	27				
(28	)	29	*	2A	+	2B	,	2C	-	2D	.	2E	/	2F				
0 30	1	31	2	32	3	33	4	34	5	35	6	36	7	37				
8 38	9	39	:	3A	;	3B	<	3C	=	3D	>	3E	?	3F				
@ 40	A	41	B	42	C	43	D	44	E	45	F	46	G	47				
H 48	I	49	J	4A	K	4B	L	4C	M	4D	N	4E	O	4F				
P 50	Q	51	R	52	S	53	T	54	U	55	V	56	W	57				
X 58	Y	59	Z	5A	[	5B	\	5C	]	5D	^	5E	_	5F				
` 60	a	61	b	62	c	63	d	64	e	65	f	66	g	67				
h 68	i	69	j	6A	k	6B	l	6C	m	6D	n	6E	o	6F				
p 70	q	71	r	72	s	73	t	74	u	75	v	76	w	77				
x 78	y	79	z	7A	{	7B	|	7C	}	7D	~	7E	DEL	7F				

Symbols are used throughout the table to represent variables in the command/response fields. Command and response examples are shown throughout the table.

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Command/response table for SIS commands

Symbol definitions

↵	= CR/LF (carriage return/line feed) (hex 0D 0A)	
←	= Carriage return (no line feed, hex 0D)	
•	= Space character	
Esc	= Escape key (hex 1B)	
X1	= Input number (for tie)	00 – (maximum number of inputs for your model) (00 = untie)
X2	= Output number	00 – (maximum number of outputs for your model) (00 = untie)
X3	= Mute, Lock mode, power supply	0 = off/mode 0/not OK 1 = on/mode 1/OK 2 = mode 2
X4	= Input number	01 – (maximum number of inputs for your model)
X5	= Audio gain	00 – 24 (1 dB/step)
X6	= Numeric dB value	–18 to +24 (45 steps of gain or attenuation)
X7	= Audio attenuation	1 – 18 (1 dB/step)
X8	= Volume adjustment range	0 – 64 (1 dB/step except for 0-to-1, which is 12.5 dB) (see the table on page 4-11)
X9	= Global preset #	00 – 64 (0 = current configuration)
X10	= Room # (for room presets)	01 – 10 max. (each can have up to 10 presets X12s assigned)
NOTE	<i>A Room is a subset of operator-selected outputs that relate to each other. The switcher supports up to 10 rooms, each of which can consist of from 1 to 16 outputs.</i>	
X11	= Name	12 characters maximum for global, room preset, input, and output names 11 characters maximum for room names Upper- and lower-case alphanumeric characters and _ : = / and spaces are valid.
NOTE	<i>The following characters are invalid in the name: {space} ~ , @ = ' [] { } < > ' " ; : \ and ?.</i>	
X12	= Room preset #	01 – 10 maximum
NOTE	<i>A Room preset is a stored configuration with all of the outputs assigned to a single room. When a room preset is retrieved from memory, it becomes the current configuration.</i>	
X13	= Video/audio mute:	0 = no mutes 1 = video mute 2 = audio mute 3 = video and audio mute
X14	= Sync frequency	xxx.xx (frequency in Hz [V] or kHz [H])
X15	= Signal detection	0 = no input detected, 1 = input detected)
X16	= RGB delay interval	Delay in ½ second increments (10 maximum)
X17	= Group # (for I/O grouping)	1 through 4 groups (0 = no group)
X18	= BME type	1 = wideband video 2 = low resolution video 3 = Sync 4 = stereo audio 5 = mono audio
X19	= # of connected BMEs in the system	1 through 6
X20	= Firmware version number to second decimal place (x.xx)	
X21	= Verbose firmware version-description-upload date/time. See page 4-19.	
X22	= Voltage	Positive or negative voltage and magnitude
X23	= Temperature	Degrees Fahrenheit
X24	= Fan speed	RPM

Command/response table for SIS commands

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Create ties			
NOTE • Commands can be entered back-to-back in a string, with no spaces. For example: 1*1!02*02&003*003%4*24\$. • The quick multiple tie and tie input to all output commands activate all I/O switches simultaneously. • The matrix switchers support 1-, 2-, and 3-digit numeric entries (1*1!, 02*02&, or 003*003\$). • The ! tie command, & tie command, and % tie command can be used interchangeably.			
NOTE When you create a tie where X1 = 00, you tie no input to the specified output (X2) (untie X2). When you create a tie where X2 = 00, you untie all outputs from input X1 .			
NOTE The & tie commands for RGB and % tie commands for video can be used interchangeably.			
Tie input X1 to output X2 , video and audio	X1 * X2 !	Out X2 •In X1 •All←	Tie input X1 's video and audio to output X2 (audio follow).
Example:	1*3!	Out03•In01•All←	Tie input 1 to output 3.
Tie input X1 to output X2 , RGBHV only	X1 * X2 &	Out X2 •In X1 •RGB←	Tie RGB only (video breakaway).
Example (see 2nd Note, above):	10*4&	Out04•In10•RGB←	Tie input 10 RGB to output 4.
Tie input X1 to output X2 , video only	X1 * X2 %	Out X2 •In X1 •Vid←	Tie video only (video breakaway).
Example (see 2nd Note, above):	7*5%	Out05•In07•Vid←	Tie input 7 to video output 5.
Tie input X1 to output X2 , audio only	X1 * X2 \$	Out X2 •In X1 •Aud←	Tie audio only (audio breakaway).
Example (see 2nd Note, above):	24*4\$	Out04•In24•Aud←	Tie input 24 audio to output 4.
Quick multiple tie	Esc +Q X1 * X2 !... X1 * X2 !←	Qik←	!, &, %, and \$ are valid.
Example:	Esc +Q3*4!3*5%3*6\$←	Qik←	Tie input 3 video and audio to output 4, tie input 3 video to output 5, and tie input 3 audio to output 6.
Tie input to all outputs, video and audio	X1 *!	In X1 •All←	Tie video and audio (audio follow).
Example:	5*!	In05•All←	Tie input 5 video and audio to all outputs.
Tie input to all outputs, RGBHV only	X1 *&	In X1 •RGB←	Tie RGB only (video breakaway).
Example (see 2nd Note, above):	28*&	In28•RGB←	Tie input 28 RGB to all outputs.
Tie input to all outputs, video only	X1 *%	In X1 •Vid←	Tie RGB only (video breakaway).
Example (see 2nd Note, above):	14*%	In14•Vid←	Tie input 14 video to all outputs.
Tie input to all outputs, audio only	X1 *\$	In X1 •Aud←	Tie audio only (audio breakaway).
View ties			
NOTE The & view tie command for RGB and % view tie command for video can be used interchangeably.			
View video and audio output tie	X2 !	X1 ←	Input X1 video and audio is tied to output X2 .
View RGB output tie	X2 &	X1 ←	Input X1 RGB is tied to output X2 .
View video output tie	X2 %	X1 ←	Input X1 video is tied to output X2 .

NOTE **X1** = Input number for tie
X2 = Output number

00 – (maximum number of inputs for your model) (00 = untie)
00 – (maximum number of outputs for your model) (00 = untie)

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Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Video mute commands			
Video mute	$\boxed{X2} * 1B$	Vmt $\boxed{X2} * 1 \leftarrow$	Mute output $\boxed{X2}$ RGB (video off).
Video unmute	$\boxed{X2} * 0B$	Vmt $\boxed{X2} * 0 \leftarrow$	Unmute output $\boxed{X2}$ RGB video on).
Read video mute	$\boxed{X2} B$	$\boxed{X3} \leftarrow$	1 = mute on, 0 = mute off.
Global video mute	1*B	Vmt1 \leftarrow	Mute all RGB outputs.
Global video unmute	0*B	Vmt0 \leftarrow	Unmute all RGB outputs.
Audio input gain and attenuation			
NOTE The set gain (G) and set attenuation (g) commands <u>are</u> case sensitive. The increment and view commands are not case sensitive.			
NOTE You can set the input level to whole dB values only, using the $\boxed{X4} * \boxed{X5} G$ or $\boxed{X4} * \boxed{X7} g$ command. The increment and decrement level ($\boxed{X4} + G$ and $\boxed{X4} - G$) commands increase and decrease the level in steps of 0.5 dB only. The $\boxed{X6}$ values for all audio gain and attenuation commands are reported in whole dB levels only; the reported $\boxed{X6}$ value is rounded up to the next higher magnitude value (for example, +1.5 dB is reported as +2 dB and -3.5 dB is reported as -4 dB).			
Set input audio gain to +dB value	$\boxed{X4} * \boxed{X5} G$	In $\boxed{X4} \bullet$ Aud $\boxed{X6} \leftarrow$	
Example:	1*2G	In01 • Aud+02 \leftarrow	Set input 1 audio gain to +2 dB.
Set input audio attenuation to -dB value	$\boxed{X4} * \boxed{X7} g$	In $\boxed{X4} \bullet$ Aud $\boxed{X6} \leftarrow$	
Increment gain	$\boxed{X4} + G$	In $\boxed{X4} \bullet$ Aud $\boxed{X6} \leftarrow$	Increase audio level by 0.5 dB.
Example:	5+G	In05 • Aud+03 \leftarrow	Increment audio input 5 level from +2 dB to +2.5 dB.
Decrement gain	$\boxed{X4} - G$	In $\boxed{X4} \bullet$ Aud $\boxed{X6} \leftarrow$	Decrease audio level by 0.5 dB.
Example:	7-G	In07 • Aud-09 \leftarrow	Decrement audio input 7 level from -08 dB to -8.5 dB.
View input gain	$\boxed{X4} G$	$\boxed{X6} \leftarrow$	

NOTE	$\boxed{X2}$ = Output number	01 – (maximum number of outputs for your model)
	$\boxed{X3}$ = Mute status	0 = off, 1 = on
	$\boxed{X4}$ = Input number	01 – (maximum number of inputs for your model)
	$\boxed{X5}$ = Audio gain	0 – 24 (1 dB/step)
	$\boxed{X6}$ = Numeric dB value	-18 to +24 (45 steps of gain or attenuation)
	$\boxed{X7}$ = Audio attenuation	1 – 18 (1 dB/step)

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description					
Audio output volume								
NOTE	The table below defines the value of each audio volume step.							
NOTE	You can set the output volume to whole dB values only , using the <code>[x2]*[x8]V</code> command. The increment and decrement level <code>[x2]+V</code> and <code>[x2]-V</code> commands increase and decrease the volume in steps of 0.5 dB only . The <code>[x8]</code> values for all audio output volume commands are reported in whole dB levels only; the reported <code>[x8]</code> value is rounded up to the next higher magnitude value (for example, 3.5 dB is reported as 4 dB).							
[x8] value	dB of attenuation	Output volume	[x8] value	dB of attenuation	Output volume	[x8] value	dB of attenuation	Output volume
00	76	0%						
01	63	5.5%	23	41	38.5%	45	19	71.5%
02	62	7%	24	40	40%	46	18	73%
03	61	8.5%	25	39	41.5%	47	17	74.5%
04	60	10%	26	38	43%	48	16	76%
05	59	11.5%	27	37	44.5%	49	15	77.5%
06	58	13%	28	36	46%	50	14	79%
07	57	14.5%	29	35	47.5%	51	13	80.5%
08	56	16%	30	34	49%	52	12	82%
09	55	17.5%	31	33	50.5%	53	11	83.5%
10	54	19%	32	32	52%	54	10	85%
11	53	20.5%	33	31	53.5%	55	9	86.5%
12	52	22%	34	30	55%	56	8	88%
13	51	23.5%	35	29	56.5%	57	7	89.5%
14	50	25%	36	28	58%	58	6	91%
15	49	26.5%	37	27	59.5%	59	5	92.5%
16	48	28%	38	26	61%	60	4	94%
17	47	29.5%	39	25	62.5%	61	3	95.5%
18	46	31%	40	24	64%	62	2	97%
19	45	32.5%	41	23	65.5%	63	1	98.5%
20	44	34%	42	22	67%	64	0	100%
21	43	35.5%	43	21	68.5%			
22	42	37%	44	20	70%			
Set the audio volume to a specific value		<code>[x2]*[x8]V</code>		<code>Out[x2]•Vol[x8]</code>				
Example:		1*50v		<code>Out01•Vol50</code>		Set output 1 volume to 79%.		
Increment volume		<code>[x2]+V</code>		<code>Out[x2]•Vol[x8]</code>		Increase volume by 0.5 dB.		
Example:		1+V		<code>Out01•Vol51</code>		Increment audio volume 0.5 dB, from 79% to 80.5%.		
Decrement volume		<code>[x2]-V</code>		<code>Out[x2]•Vol[x8]</code>		Decrease volume by 0.5 dB.		
View output volume		<code>[x8]V</code>		<code>[x8]</code>				

NOTE **X2** = Output number
X8 = Volume adjustment range
 01 – (maximum number of outputs for your model)
 0 – 64 (1 dB/step except for 0-to-1, which is 12.5 dB)

Programmer's Guide, cont'd

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Audio mute commands			
Audio mute	[X2]*1Z	Amt[X2]*1↵	Mute output [X2] audio (audio off).
Audio unmute	[X2]*0Z	Amt[X2]*0↵	Unmute output [X2] audio (audio on).
Read audio mute	[X2]Z	[X3]↵	1 = mute on, 0 = mute off.
Save, recall, and directly write global and room presets			
NOTE <ul style="list-style-type: none"> If you try to recall a preset that is not saved, the matrix switcher responds with the error code E11. If you try to save a room preset for a room that has not been created, the switcher responds with the error code E11. The following characters are invalid in preset names: +, -, ` @ = [ ] { } ' " ; : | \ and ?. 			
Save current configuration as a global preset	[X9],	Spr[X9]↵	Command character is a comma.
Example:	9,	Spr9↵	Save current ties as preset 9.
Recall a global preset	[X9].	Rpr[X9]↵	Command character is a period.
Example:	5.	Rpr05↵	Recall preset 5, which becomes the current configuration.
Direct write process for a global preset —			
NOTE The direct write of a global preset should always be preceded by a clear global preset ties command of that same preset number, as shown below. In a directly-written preset, each output position's tied input (or no tied input) remains unchanged unless overwritten or cleared.			
If you do not clear the ties in a global preset number before you directly write a global preset to that number, ties that are part of the previous version of the specified preset with the same number can unexpectedly become part of the newly-created preset.			
Clear a global preset's ties	[Esc]+[X9]P0*!↵	Spr[X9]↵	Clear all ties in preset [X9].
Directly write a global preset	[Esc]+[X9]P[X1]*[X2]*[X1]*[X2]*%[X1]*[X2]\$... [X1]*[X2]*%↵	Spr[X9]↵	Enter as many ties as are valid for this configuration. The ! tie all, & tie RGB, % tie video, and \$ tie audio commands are all valid.
Example:	[Esc]+27P0*!↵ [Esc]+27P2*5!10*9\$13*11%3*10&↵	Spr27↵ Spr27↵	Clear all ties in preset 27. <u>Brackets are shown to separate ties for clarity only.</u> Create global preset 27, which ties video and audio input 22 to output 5, RGBHV input 15 to output 29, video input 13 to output 26, and audio input 3 to output 8.

NOTE	[X1] = Input number for tie	01 – (maximum number of inputs for your model)
	[X2] = Output number	01 – (maximum number of outputs for your model)
	[X3] = Mute status	0 = off, 1 = on
	[X9] = Global preset #	01 – 64

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Save, recall, and directly write presets (continued)			
Write room outputs	<code>[Esc][X10],[X2]¹, ... [X2]ⁿMR ←</code>	<code>Mpr[X10][X2]¹, [X2]², ... [X2]ⁿ ←</code>	See notes below.
NOTE <ul style="list-style-type: none"> The maximum number of rooms (X10) is 10. A room can contain a maximum of 16 outputs (X2s). An output can belong to only one room. If you try to save a room preset for a room that has not been created, the switcher responds with the error code E11. If no room name is assigned, the default name (X11) is "Room #X10•X2¹, •X2², •X2³". 			
Example:	<code>[Esc]8,3,04,5,6MR ←</code>	<code>Mpr8,03,04,05,06 ←</code>	Outputs 3, 4, 5, and 6 are assigned to room 8.
Read room outputs	<code>[Esc][X10]MR ←</code>	<code>[X11][X2]¹, [X2]², ... [X2]ⁿ ←</code>	
Example:	<code>[Esc]3MR ←</code>	<code>Class 1,01,02,08,09 ←</code>	Outputs 1, 2, 8, and 9 are assigned to room 3, which named "Class 1".
Save current ties as a room preset	<code>[X10]*[X12],</code>	<code>Rmm[X10]•Spr[X12] ←</code>	Command character is a comma.
Example:	<code>3*9,</code>	<code>Rmm03•Spr09 ←</code>	Save current ties as preset 9 for room 3.
Recall room preset	<code>[X10]*[X12].</code>	<code>Rmm[X10]•Rpr[X12] ←</code>	Command character is a period.
Directly write a room preset	<code>[Esc]+[X10]*[X12]P[X1]*[X2][X1]*[X2]%[X1]*[X2]\$... [X1]*[X2]! ←</code>	<code>Rmm[X10]•Spr[X12] ←</code>	Enter as many ties as are valid for this configuration. The ! tie, & tie, and % tie commands are all valid and equivalent.
Example:	<code>[Esc]+7*3P12*7&13*35\$4*26%6*6! ←</code>	<code>Rmm07•Spr03 ←</code>	Brackets are shown to separate ties for clarity only. Create preset 3 for room 7, which ties audio input 12 to output 7, video input 13 to output 35, RGBHV input 4 to output 26, and video and audio input 6 to output 6.

NOTE	X1 = Input number	01 – (maximum number of inputs for your model)
	X2 = Output number	01 – (maximum number of outputs for your model)
	X10 = Room # (for room presets)	01 – 10 (Each can have up to 10 presets (X12 s) assigned.)
	X11 = Name	12 alphanumeric characters maximum
	X12 = Room preset #	01 – 10

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Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
View ties, gain, volume, mutes, and presets			
NOTE The & view tie command for RGB and % view tie command for video can be used interchangeably.			
View video and audio output tie	[X2]!	[X1]←	Input [X1] video and audio is tied to output [X2] .
Example:	15!	27←	Input 27 video and audio tied to output 15.
View RGB output tie	[X2]&	[X1]←	Input [X1] RGB is tied to output [X2] .
Example:	7&	02←	Input 2 RGB is tied to output 7.
View video output tie	[X2]%	[X1]←	Input [X1] video is tied to output [X2] .
Example:	3%	06←	Input 6 video is tied to output 3.
View output volume	[X2]V	[X8]←	
View input gain	[X4]G	[X6]←	
View output mutes	[Esc]VM←	[X13]¹, [X13]², ... [X13]ⁿ←	Each [X13] response is the mute status of an output, starting from output 1. <i>n</i> is the highest-numbered output.
Example:	[Esc]VM←	Mut00001000000230000000000000000000←	Output 5 video is muted, output 12 audio is muted, and output 13 video and audio are muted. All other outputs are unmuted.
CrossPoint 450 Plus 6432 HVA			
NOTE The “Mut” portion of the response appears only when the switcher is in Verbose mode 2 or 3. See the “Set verbose mode” command on page 4-23.			
View global preset video configuration	[Esc][X9]*[X2]*1VC←	[X1]ⁿ•[X1]ⁿ⁺¹•...•[X1]ⁿ⁺¹⁵•Vid←	Show preset [X9] ’s video configuration. Show the input ([X2]) tied to 16 sequential outputs, starting from output [X2] .
Command description:	preset # ([X9])*starting output # ([X2])*1(=video)VC		
Response description:	input # ([X1]) tied to [X2]•[X1] tied to [X2]+1•[X1] tied to [X2]+2•...•[X1] tied to [X2]+15•Vid←		
Example:	[Esc]23*1*1VC←		
MAV Plus 6432	input 34 tied to output 19 no tied input input 8 tied to output 29		
	Response = tied input: 08•08•34•08•08•49•49•00•08•01•01•01•08•08•08•08•Vid←		
	Output: 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32		
	Each position shown in the response is an output: left = starting, right = starting output+15. The number in each position is the input tied to that output. In this example, input 1 is tied to outputs 26 through 28; input 8 to outputs 17, 18, 20, 21, 25, and 29 through 32; input 34 to output 19; and input 49 to outputs 22 and 23. No input is tied to output 24.		
NOTE [Esc][X9]*[X2]*1VC← where [X9] = 0 returns 16 tied outputs of the switcher’s current video configuration.			

NOTE	[X1] = Input number for tie	01 – (maximum number of inputs for your model)
	[X2] = Output number	01 – (maximum number of outputs for your model)
	[X6] = Numeric dB value	–18 to +24 (45 steps of gain or attenuation)
	[X8] = Volume adjustment range	0 – 64 (1 dB/step except for 0-to-1, which is 12.5 dB)
	[X9] = Global preset #	00 – 64 (00 = current configuration)
	[X13] = Video/audio mute:	0 = no mutes 2 = audio mute
		1 = video mute 3 = video and audio mute

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
View ties, gain, volume, mutes, and presets (continued)			
View global preset audio configuration	[Esc][X9]*[X2]*2VC ←	[X1]ⁿ•[X1]ⁿ⁺¹•...•[X1]ⁿ⁺¹⁵•Aud ←	Show preset [X9] 's audio configuration. Show the input ([X2]) tied to 16 sequential outputs, starting from output [X2] .
<i>Command description:</i> <i>Response description:</i> <i>Example:</i> <i>CrossPoint Plus 6464 HVA</i>	preset # ([X9])*starting output # ([X2])*2(=audio)VC input # ([X1]) tied to [X2]•[X1] tied to [X2]+1•[X1] tied to [X2]+2• ... •[X1] tied to [X2]+15•Aud ← [Esc]4*17*2VC ←	input 1 tied to output 3 no tied input input 58 tied to output 15 Response = tied input: 01•01•01•01•02•22•22•00•03•03•03•03•60•60•58•58•Aud ← Output: 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16	
<i>Each position shown in the response is an output: left = starting, right = starting output+15. The number in each position is the input tied to that output.</i> <i>In this example, input 1 is tied to outputs 1 through 4, input 2 is tied to output 5, input 3 is tied to outputs 9 through 12, and input 22 is tied to outputs 6 and 7, input 58 is tied to outputs 15 and 16, input 60 is tied to outputs 13 and 14. No input is tied to output 8.</i>			
NOTE [Esc][X9]*[X2]*1VC ←	where [X9] = 0 returns 16 tied outputs of the switcher's current audio configuration.		
View room video preset configuration	[Esc][X10]*[X12]*[X2]*1VC ←	[X1]ⁿ•[X1]ⁿ⁺¹•...•[X1]ⁿ⁺¹⁵•Vid ←	Show room [X10] , preset [X12] 's configuration. Show the input tied to up to 16 outputs assigned to room [X10] . <i>n</i> is the highest-numbered input.
<i>Command description:</i> <i>Response description:</i>	room # ([X10])*room preset # ([X12])*starting output # ([X2])*1(= video)VC input # ([X1]) tied to [X2]•[X1] tied to [X2]+1•[X1] tied to [X2]+2• ... •[X1] tied to [X2]+15•Vid ← <i>The response is similar to the response to the "View global preset video configuration" command, on page 4-14.</i>		
View room audio preset configuration	[Esc][X10]*[X12]*[X2]*2VC ←	[X1]ⁿ•[X1]ⁿ⁺¹•...•[X1]ⁿ⁺¹⁵•Aud ←	Show room [X10] , preset [X12] 's configuration. Show the input tied to up to 16 outputs assigned to room [X10] . <i>n</i> is the highest-numbered input.
<i>Command description:</i> <i>Response description:</i>	room # ([X10])*room preset # ([X12])*starting output # ([X2])*2(= audio)VC input # ([X1]) tied to [X2]•[X1] tied to [X2]+1•[X1] tied to [X2]+2• ... •[X1] tied to [X2]+15•Aud ← <i>The response is similar to the response to the "View global preset audio configuration" command, above.</i>		

NOTE **X1** = Input number for tie
X2 = Output number
X9 = Global preset #
X10 = Room # (for room presets)
X12 = Room preset #

01 – (maximum number of inputs for your model)
01 – (maximum number of outputs for your model)
00 – 64 (00 = current configuration)
01 – 10 (Each can have up to 10 presets [**X12**s] assigned.)
01 – 10

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Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Digital Sync Validation Processing (DSVP)			
View DSVP (individual sync frequency) <i>Example:</i>	[X4] LS 2LS	[X14] [X14] ↵ 031.5,060.00↵	Listed as horizontal frequency, vertical frequency. Input 2 frequency is 31.5 kHz (horizontal) and 60 Hz (vertical).
NOTE The matrix switcher returns 000.00,000.00 if there is no connection or if sync frequencies are not applicable.			
View connections	0LS	[X15] ¹ [X15] ² [X15] ³ ... [X15] ⁿ ↵	Each [X15] response is the connection status (0 = no input detected, 1 = input detected) of an input, starting from input 1. <i>n</i> is the maximum number of inputs for this model.
RGB delay (CrossPoint)			
Set RGB delay <i>Example:</i>	[Esc] [X2] * [X16] D↵ [Esc] 13*7D↵	Out [X2] •Dly [X16] *1↵ Out13•Dly07↵	Set the RGB interval for ties to output 13 to 3.5 seconds (7 x 0.5 sec.).
View RGB delay <i>Example:</i>	[Esc] [X2] D↵ [Esc] 14D↵	[X16] ↵ 05↵	Output 14 interval is 2.5 seconds (5 x 0.5 sec.).
I/O Grouping			
NOTE The group that is assigned in each of the following I/O grouping commands ([X17]) must be 1, 2, 3, 4, or 0 (not grouped).			
Write input grouping	[Esc] [X17] ¹ [X17] ² ... [X17] ⁿ I↵	Gri [X17] ¹ [X17] ² [X17] ³ ... [X17] ⁿ ↵	Each [X17] entry is the group number assigned to an input position, starting from input 1. <i>n</i> is the highest- numbered input for this model.
<i>Example:</i> MAV Plus 3264	[Esc] 40133000044...4I↵	See below.	
<div style="display: flex; justify-content: space-between; font-size: small;"> Input 1 in group 4 Input 2 not grouped Input 32 in group 3 </div> <div style="font-family: monospace; font-size: x-small;"> Response #s = group: Gri 4 0 1 3 3 0 0 0 0 4 4 4 1 1 2 2 1 2 2 3 3 3 2 1 2 2 3 3 3 3 Input: 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 </div>			
Input 1 - Group 4, Input 2 - Group 0 (not grouped), ... Input 32 - Group 4.			
NOTE If verbose mode is off (see the "Set verbose mode" SIS command on page 4-23), the Gri preface is omitted in the response.			
Write output grouping	[Esc] [X17] ¹ [X17] ² ... [X17] ⁿ O↵	Gro [X17] ¹ [X17] ² [X17] ³ ... [X17] ⁿ ↵	Each [X17] entry is the group number assigned to an output position, starting from output 1. <i>n</i> is the highest-numbered output for this model.
NOTE If verbose mode is off (see the "Set verbose mode" SIS command on page 4-23), the Gro preface is omitted in the response.			

NOTE	[X2] = Output number	01 – (maximum number of outputs for your model)
	[X4] = Input number	01 – (maximum number of inputs for your model)
	[X14] = Sync frequency	xxx.xx (frequency in Hz [V] or kHz [H])
	[X15] = Signal detection	0 = no input detected 1 = input detected
	[X16] = RGB delay interval	Delay in ½ second increments (10 maximum)
	[X17] = Group # (for I/O grouping)	1 – 4 (0 = no group)

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
I/O Grouping (continued)			
Read input grouping	Esc I←	X17 X17 X17 ... X17 ↵	Each X17 entry is the group number assigned to an input position, starting from input 1. <i>n</i> is the highest-numbered input for this model.
Example: MAV Plus 4848	Esc I←	See below.	
<p>Input 1 in group 1 Input 9 not grouped Input 48 in group 3</p> <p>Response = group: 1 1 1 3 3 0 0 0 0 4 4 4 4 1 1 1 2 2 3 3 3 3 2 1 2 2 3 3 3 3</p> <p>Input: 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48</p>			
Read output grouping	Esc O←	X17 X17 X17 ... X17 ↵	Each X17 entry is the group number assigned to an output position, starting from output 1. <i>n</i> is the highest-numbered output for this model.
Names			
Write global preset name	Esc X9 , X11 NG←	Nmg X9 , X11 ↵	
Example:	Esc 1,Security 1NG←	Nmg01,Security 1↵	Name global preset 1 "Security 1".
Read global preset name	Esc X9 NG←	X11 ↵	
Example:	Esc 2NG←	Security 2↵	Global preset 2 is named "Security 2".
Write room name	Esc X10 , X11 NR←	Nmr X10 , X11 ↵	
Example:	Esc 1,Classrm 1NR←	Nmr01,Classrm 1↵	Name room 1 "Classrm 1".
Read room name	Esc X10 NR←	X11 ↵	
Write room preset name	Esc X10 * X12 , X11 NP←	Nmp X10 * X12 , X11 ↵	
Example:	Esc 1*3,Podium_DVDNP←	Nmp01*3,Podium_DVD↵	Name room1, preset 3 "Podium_DVD".
Read room preset name	Esc X10 , X12 NP←	X11 ↵	
NOTE	<ul style="list-style-type: none"> If a preset is unassigned, the X11 displays [unassigned]. If a global preset is saved, but not yet named, the default name is Preset X9. If a room preset is saved, but not yet named, the default name is RmX10 PrstX12. 		
Write input name	Esc X4 , X11 NI←	Nmi X4 , X11 ↵	
Example:	Esc 1,Podium camNI←	Nmi01,Podium cam↵	Name input 1 "Podium cam".
Read input name	Esc X4 NI←	X17 ↵	
Write output name	Esc X2 , X11 NO←	Nmo X2 , X11 ↵	
Example:	Esc 1,Main PJ1NO←	Nmo01,Main PJ1↵	Name output 1 "Main PJ1".
Read output name	Esc X2 NO←	X11 ↵	

NOTE	X2 = Output number	01 – (maximum number of outputs for your model)
	X4 = Input number	01 – (maximum number of inputs for your model)
	X9 = Global preset #	01 – 64
	X10 = Room # (for room presets)	01 – 10 (Each can have up to 10 presets (X12 s) assigned.)
	X11 = Name	12 alphanumeric characters maximum for presets, inputs, and outputs 11 characters maximum for room names
	X12 = Room preset #	01 – 10
	X17 = Group # (for I/O grouping)	1 – 4 (0 = no group)

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Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Lock (executive) modes			
NOTE See "Setting the front panel locks (Executive modes)" in chapter 3, "Operation", for more Lock mode information.			
Lock all front panel functions	1X	Exe1↵	Enable Lock mode 1.
Lock advanced front panel functions	2X	Exe2↵	Enable Lock mode 2.
Unlock all front panel functions	0X	Exe0↵	Enable Lock mode 0.
View lock status	X	X3↵	
Resets			
Reset all mutes	EscZZ↵	Zpz↵	Unmute all outputs.
Reset audio input levels	EscZA↵	Zpa↵	Reset all audio input levels (gain and attenuation) to 0 dB.
Reset audio output levels	EscZV↵	Zpv↵	Reset all audio output levels (volume) to 100% (no attenuation).
Reset global presets and names	EscZG↵	Zpg↵	Clear all global presets and their names.
Reset one global preset	EscX9ZG↵	ZpgX9↵	Clear global preset X9.
Reset room map	EscZR↵	Zpr↵	Clear all room definitions.
Reset individual room	EscX10ZR↵	ZprX10↵	Delete room X10.
Reset all room presets and names	EscZP↵	Zpp↵	Clear all room presets and names.
Reset individual room preset	EscX10X12ZP↵	ZppX10X12↵	Clear an individual room preset and name.
Reset RGB delays	EscZD↵	Zpd↵	Reset all RGB delays to 0.0 seconds.
Reset whole switcher	EscZXXX↵	Zpx↵	Clear all ties and presets.
Absolute reset	EscZQQQ↵	Zpq↵	Similar to Reset whole switcher , plus clear the IP address to 192.168.254.254 and subnet mask to 255.255.000.000.
Information requests			
Information request	I	VX4X2•AX4X2TX18UX19↵	<p>VX4X2 = video size, AX4X2 = audio size, TX18 = BME type, UX19 = # of BMEs in system.</p>
Example: (MAV 450 Plus 6448 with a connected audio BME)	I	V64X48•A64X48•T2•U2↵	<p>This low resolution matrix switcher (T2) has 64 video and 64 audio inputs by 48 video and 48 audio inputs. This is a two BME system (a video and audio BME).</p>

NOTE X2 = Output number
X3 = Lock mode
X4 = Input number
X9 = Global preset #
X10 = Room # (for room presets)
X12 = Room preset #
X18 = BME type
X19 = # of connected BMEs

01 – (maximum number of outputs for your model)
0, 1 or 2
01 – (maximum number of inputs for your model)
01 – 64
01 – 10 (Each can have up to 10 presets (X12s) assigned.)
01 – 10
1 = wideband video 3 = sync 5 = mono audio
2 = low resolution video 4 = stereo audio
1 – 6

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Information requests (continued)			
Request BME part number	N	nn-nnn-nn↵	See appendix B for numbers.
Example:	N	60-768-41↵	CrossPoint 450 Plus 6464 with front panel controller.
<div>NOTE</div> There are up to three separate sets of Extron firmware on which the switcher can report: the controller firmware, which is the overall control firmware; the Ethernet protocol firmware, which handles the Ethernet interface; and the latest optional Extron firmware update, which is available at www.extron.com .			
Query firmware version	Q	X20↵	The factory-installed controller firmware version is 1.23 (sample value only).
Example:	Q	1.23↵	
Query controller firmware version (verbose)	0Q	X20 X21 X21↵	Provide a detailed status of the Ethernet protocol firmware, the controller firmware, and any firmware upgrade. The firmware that is running is marked by an asterisk (*). A caret (^) indicates that the firmware has a bad checksum or an invalid load. ??? indicates that firmware is not loaded.
Response description:	Ethernet protocol firmware version-controller firmware version-updated firmware version↵		
Example:	0q		
Response:	1.23-0.14(0.20-64x64 Series -Wed, 22 Feb 2006 00:00:00 GMT)-0.25*(0.24-64x64 Series -Thu, 16 Mar 2006 16:39:21 GMT)↵		
	Ethernet protocol firmware	CrossPoint/MAV firmware version	Updated firmware version
Request system status	S	X22 X22 X22 X22 X22 X22 X22 X23 X24 X24 X3 X3↵	Fans receiving 11.52 V Secondary power supply is on and Ok 4.98 3.30 2.55 11.52 -5.21 -12.35 11.65 78.80 753 774 1 1↵ 5V power system at 4.98V Fan 1 rotating at 753 RPM
Response description:	+5V+3.3V+2.5V•Fan voltage-5V-12V+12V•Temp•Fan1 RPM•Fan2 RPM•Primary PS•Secondary PS↵		
Example:	S		
<div>NOTE</div> If one of the variables is not applicable to a BME (such as fans for a video BME), the response for that variable is "----".			

NOTE	X3 = Power supply status	0 = not OK	1 = OK
	X20 = Firmware version number to second decimal place (x.xx)		
	X21 = Verbose firmware version-description-upload date/time		
	X22 = Voltage	Positive or negative voltage and magnitude	
	X23 = Temperature	Degrees Fahrenheit	
	X24 = Fan speed	RPM	

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Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
File Directory			
NOTE The response to the "View File Directory" command differs, depending on whether the command is sent via an RS-232/RS-422 or Telnet connection or sent via a Web browser connection.			
View file directory RS-232/RS-422 port and Telnet	Esc DF←	filename1,date/time,length↵ filename2,date/time,length↵ filename3,date/time,length↵ : : : filenamen,date/time,length↵ # of Bytes•Left↵↵	List user-supplied files.
View file directory Web browser	Esc DF←	Var file = new array (); File [1] = 'filename1,date1,filesize1'; File [2] = 'filename2,date2,filesize2'; File [3] = 'filename3,date3,filesize3'; : : : File [n] = 'filenamen,daten,filesize'; File [n+1] = # of Bytes•Left	List user-supplied files.
Erase user-supplied Web pages/files	Esc filenameEF←	Delfilename↵	

Command/Response Table for IP-Specific SIS Commands

Symbol definitions

X30 = Matrix name	(Up to 240 characters)
NOTE The following characters are invalid in the name: {space} ~ , @ = ` [ ] { } < > ' " ; : \ | and ?.	
X31 = Default name	Factory default name (model name + last 3 pairs of MAC address)
X32 = Time and date (set)	In the format: MM/DD/YY•HH:MM:SS <i>where</i> : MM = month: 01 (January) through 12 (December) DD = day: 01 – 31 YY = year: 00 – 99 HH = hour: 00 – 24 MM = minutes: 00 – 59 SS = seconds: 00 – 59
X33 = Time and date (read)	In the format: Day,•DD•Mmm•YYYY•HH:MM:SS <i>where</i> Day = weekday: Mon – Sun DD = day: 01 – 31 Mmm = month: Jan – Dec YYYY = year: 2000 – 2099 HH = hour: 00 – 24 MM = minutes: 00 – 59 SS = seconds: 00 – 59
X34 = GMT offset	-12.0 through +14.0 (hours and minutes removed from GMT)
X35 = Daylight Saving Time	0 = Daylight Saving Time off/ignore 1 = Daylight Saving Time on (northern hemisphere) 2 = Daylight Saving Time on (Europe) 3 = Daylight Saving Time on (Brazil)
X36 = IP address	###-###-###-###
X37 = Hardware (MAC) address	##-##-##-##-##-##
X38 = Number of open connections	0 – 255
X39 = Password	12 alphanumeric characters
NOTE The following characters are invalid in passwords: {space} ~ , @ = ` [ ] { } < > ' " ; : \ | and ?.	
X40 = Domain name	Standard domain name conventions apply (for example, xxx.com)
NOTE The following characters are invalid in passwords: {space} ~ , @ = ` [ ] { } < > ' " ; : \ | and ?. The @ character is only acceptable as the lead-in to the domain name (such as @extron.com).	
X41 = E-mail account	65 – 72. 65 = e-mail recipient #1, 66 = 2, 67 = 3, ... , 72 = recipient #8.
X42 = E-mail address	Typical e-mail address format (for example: nnnnn@xxx.com)
X43 = Notify when?	0 = No response, 1 = fail/missing, 2 = fixed/restored, 3 = both 1 and 2
X44 = Notification selections	01 – 64 = input numbers 98 = power supplies 99 = fans
X45 = Notify status (for read)	66-digit number. For each digit: 0 = do not notify, 1 = notify.
X46 = DHCP	0 = off, 1 = on
X47 = Port #	01 = rear panel Remote port, 02 = front panel Configuration port)
X48 = Baud rate	9600, 19200, 38400, 115200
X49 = Parity	Odd, even, none, mark, space (only first letter required)
X50 = Data bits	7, 8
X51 = Stop bits	1, 2
X52 = Port type	0 = RS-232, 1 = RS-422
X53 = Verbose mode	0 = Clear/none (default for Telnet connection) 1 = Verbose mode (default for RS-232 / RS-422 connection) 2 = Tagged responses for queries 3 = Verbose mode and tagged for queries
NOTE If tagged responses is enabled, all read commands return the constant string and the value as the set command does (for example, the read matrix name command, Esc CN←, returns IPN• X30 ←).	
X54 = Security level	00 = Anonymous 10 = Extended security levels 1 through 10 11 = User 12 = Administrator
X55 = Port timeout interval (in 10-sec. increments)	1 (= 10 seconds) – 65000 (default is 30 = 300 seconds = 5 minutes)

Programmer's Guide, cont'd

Command/response table for IP-Specific SIS commands

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
IP setup commands			
Set matrix name	Esc X30 CN←	Ipn• X30 ←	
Read matrix name	Esc CN←	X30 ←	
Reset matrix name to factory default	Esc •CN←	Ipn• X30 ←	Model name plus the last 3 pairs of the MAC address.
Set time and date	Esc X32 CT←	Ipt X32 ←	
Read time and date	Esc CT←	X33 ←	
Set GMT offset	Esc X34 CZ←	Ipz X34 ←	In the command, the divider between hours and minutes can be either a colon or a period. In the response, the divider is a colon.
Example:	Esc 8.0CZ←	Ipz+08:00←	
Set Daylight Saving Time	Esc X35 CX←	X35 ←	
Read Daylight Saving Time	Esc CX←	X35 ←	
Set IP address	Esc X36 CI←	Ipi X36 ←	
Read IP address	Esc CI←	X36 ←	
Read hardware (MAC) address	Esc CH←	X37 ←	
Read # of open connections	Esc CC←	X38 ←	
Set subnet mask	Esc X36 CS←	Ips X36 ←	
Read subnet mask	Esc CS←	X36 ←	
Set gateway IP address	Esc X36 CG←	Ipg X36 ←	
Read gateway IP address	Esc CG←	X36 ←	
Set administrator password	Esc X39 CA←	Ipa• X39 ←	
Read administrator password	Esc CA←	X39 ←	
Reset (clear) administrator password	Esc •CA←	Ipa•←	
Set user password	Esc X39 CU←	Ipu• X39 ←	
Read user password	Esc CU←	X39 ←	
Reset (clear) user password	Esc •CU←	Ipu•←	
Set mail server, domain name	Esc X36 , X40 , X39 CM←	Ipm X36 , X40 , X39 ←	
Read mail server, domain name	Esc CM←	X36 , X40 , X39 ←	
NOTE The Set e-mail recipient (CR) command sets the recipient for e-mail notifications. To turn e-mail notifications on, you must then set the events that the switcher reports using one or more separate Set e-mail events (EM) commands (see the next page).			
Set e-mail recipient	Esc X41 , X42 CR←	Ipr X41 , X42 ,←	
Example:	Esc 72,Jsmith@folklore.netCR←	Ipr72,Jsmith@folklore.net,←	
Read e-mail recipient	Esc X41 CR←	X42 ,←	

Command/response table for IP-Specific SIS commands (continued)

[illegible]

Special Characters

The HTML language reserves certain characters for specific functions. The switcher does not accept these characters as part of preset names, the switcher's name, passwords, or locally created file names.

The switcher rejects the following characters:

{space (spaces **are** ok for names)} + ~ , @ = ' [] { } < > ' " semicolon (;)
colon (:) | \ and ?.



CrossPoint 450 Plus and MAV Plus Switchers

5

Chapter Five

Matrix Software

Matrix Switchers Control Program

Button Label Generator Program

Matrix Software

Two software programs accompany the matrix switcher BMEs:

- The Extron Matrix Switcher Control Program, which communicates with the switcher BME 0 via the RS-232/RS-422 port, Configuration port, and the Ethernet port, provides an easy way to set up ties and sets of ties.
- The Extron Button-Label Generator, which allows you to design and print labels for the buttons on the optional front panel.

Both programs are compatible with Windows 2000, Windows XP, and later. Updates to these programs can be downloaded from the Extron Web site (www.extron.com).

Matrix Switchers Control Program

Installing the software

The program is contained on the Extron Software Products DVD. Install the software as follows:

NOTE For full functionality, install both of the following programs:

- The Matrix Switchers Control Program
 - The Firmware Loader
1. Insert the DVD into the drive. The Extron software DVD window (figure 5-1) should appear automatically.



Figure 5-1 — Software disk window

NOTE If the window does not self-start, run *Launch.exe* from the DVD.

2. Click the **Software** tab (figure 5-1).

3. Scroll to the desired program and click **Install** (figure 5-2).

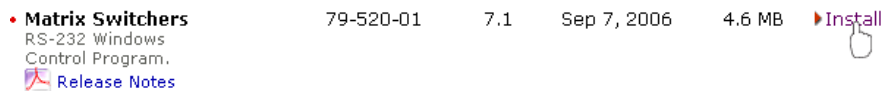


Figure 5-2 — Software installation

4. Follow the on-screen instructions. By default, the installation of the Matrix Switchers Control Program creates a C:\Program Files\Extron\Matrix_Switchers directory, and it places the following four icons into a group folder named "Extron Electronics\Matrix Switchers":

- MATRIX Switcher+ Control Program
- MATRIX Switcher+ Help
- Uninstall MATRIX Switcher
- Check for Matrix Updates

NOTE Besides the LAN port, the CrossPoint or MAV switcher can support remote control via either the rear panel Remote RS-232/RS-422 port or the front panel Configuration port (matrix sizes up to 1616).

Remote RS-232/RS-422 port — The port can be configured for either the RS-232 or RS-422 serial communication protocol and operate at 9600, 19200, 38400, or 115200 baud. See "Selecting the rear panel Remote port protocol and baud rate" in chapter 3, "Operation", to configure the rear panel port from the front panel.

Configuration port (matrix sizes up to 1616 only) — The port supports RS-232 serial communication protocol only. The port can operate at 9600, 19200, 38400, or 115200 baud, but **Extron recommends leaving this port at 9600 baud**. See the Set serial port parameters commands on page 4-23 to configure either port using an SIS command.

Software operation via Ethernet

When a matrix switcher BME is connected to an Ethernet WAN or LAN, up to 200 users can operate it, locally or remotely, using the Matrix Switchers Control Program. See "Ethernet" in chapter 2, "Installation", for installation details.

Connection to the switcher BME via the Ethernet is password protected. There are two levels of password protection: administrator and user. Administrators have full access to all switching capabilities and editing functions. Users can select inputs and outputs, set and recall presets, and view all settings with the exception of passwords. If the same password or no password is required for logging on, all personnel log on with administrator privileges. Fields and functions that exceed user privileges are not selectable in the Matrix Switchers Control Program when the operator is logged on as a user.

Ethernet protocol settings

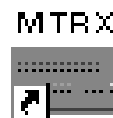
The IP Settings/Options window (figure 5-7 on page 5-8) provides a location for viewing and, if connected via the RS-232 link or if logged on via the Ethernet port as an administrator, editing settings unique to the Ethernet interface. See "IP Settings/Options window" later in this chapter for more details.

Matrix Software, cont'd

Using the Matrix Switcher Control software

Many items found in the Matrix Switchers Control Program are also accessible via front panel controls (see chapter 3, "Operation") and under SIS control (see chapter 4, "Programmer's Guide"). The Matrix Switcher Help Program provides information on settings and on how to use the control program, itself.

1. To run the Matrix Switchers Control Program, click **Start** > **Programs** > **Extron Electronics** > **Matrix Switchers** > **MATRIX Switcher + Control Pgm.**



The Comm Port Selection window (figure 5-3) appears.

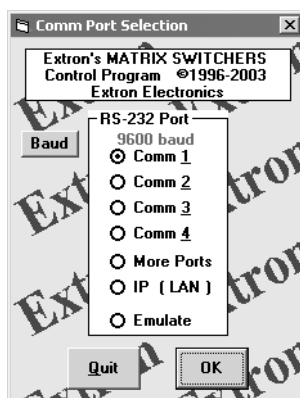
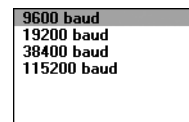


Figure 5-3 — Comm port selection window

2. Choose either the comm port that is connected to one of the switcher's serial ports, **IP [LAN]**, or **Emulate**.

- If you selected a comm port, check the baud rate displayed in the Baud Rate field. If you need to change the baud rate, click the **Baud** button and double-click on the desired baud rate.



Click **OK**. The Extron Matrix Switchers Control Program window (figure 5-5 and figure 5-6 on page 5-6 and page 5-7) appears, displaying the current configuration of the attached matrix. Proceed to step 4.

- If you selected **IP [LAN]**, click **OK** and proceed to step 3.
- If you selected **Emulate**, click **OK** and see "Using Emulation mode" on page 5-24.

3. If you selected **IP [LAN]** in step 2, the IP Connection window appears (figure 5-4).

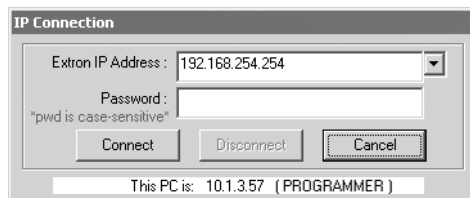


Figure 5-4 — Address and password entry

- a. Examine the Matrix IP Address field in the IP Connection window. The field displays the last Extron IP address entered.

If the IP address is correct, proceed to step 3b.

If the address is not correct, either click in the Extron IP Address field and enter the IP address or click on the scroll down button (▼) and select from among the recently used addresses. Proceed to step 3b.

NOTE *If the local system administrators have not changed the value, the factory-specified default, 192.168.254.254, is the correct value for this field.*

- b. If the switcher is password protected, click in the Password field and enter the appropriate administrator or user password.
- c. Click **Connect**.

If you logged on using the administrator password, the program connects you to the matrix switcher with all of the administrator rights and privileges. The Extron Matrix Switchers Control Program window appears (figure 5-5 and figure 5-6, on page 5-6 and page 5-7), displaying the current configuration of the attached matrix. Proceed to step 4.

If you logged on using the user password, the program connects you to the matrix switcher with only user capabilities.

If an incorrect password was entered, the program beeps and returns to the password entry display.

Matrix Software, cont'd

4. Use the program to operate the switcher as follows:
 - To create a tie, drag an input box to one or more output boxes. To remove a tie, drag the output box to its tied input box or to the trash can.
 - To set up audio in *Follow* mode (audio and video have the same tie configuration), select the **Follow** box at the bottom of the window. To set up audio in breakaway mode (audio and video have different tie configurations), deselect the **Follow** box.
 - To make the control program easier to use, assign a device icon to each input and output. Click on a box that represents an input or output, and drag the desired icon onto the box from the icon palette that appears.

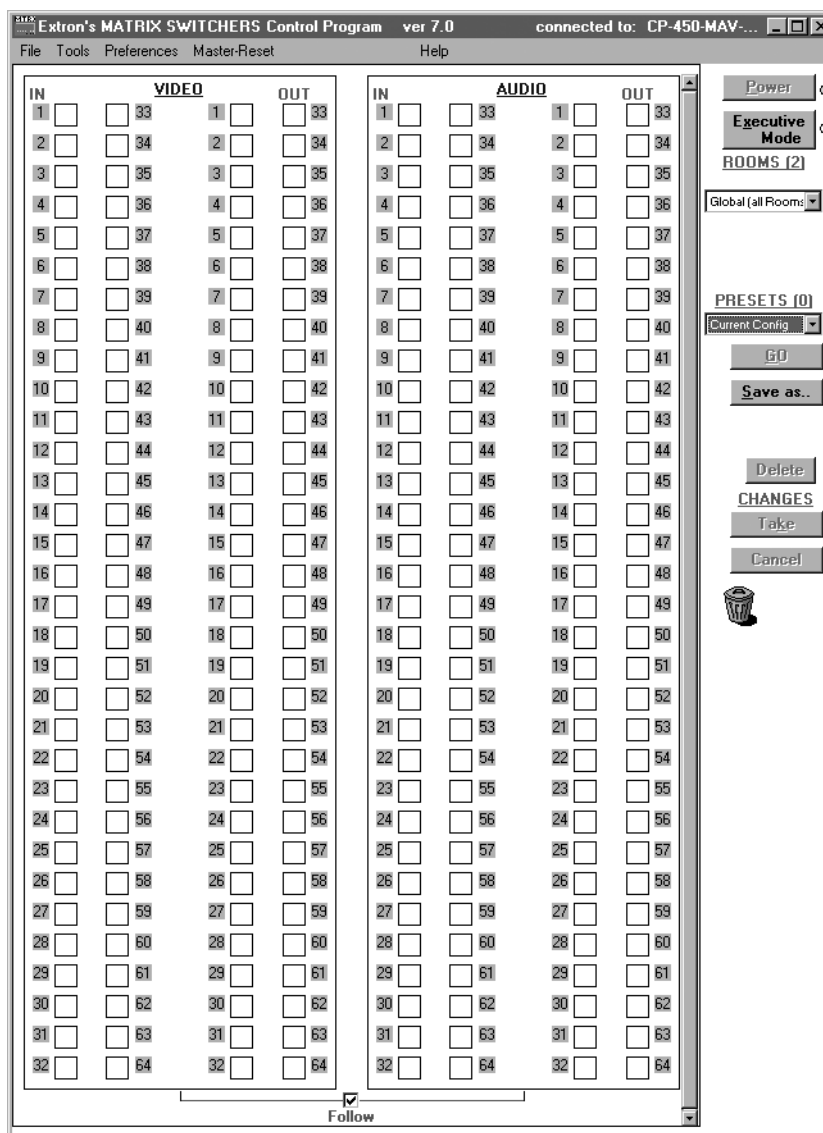


Figure 5-5 — Extron Matrix Switchers Control Program window

- For quick display of information on a specific input or output device, position the pointer tool over that device in the control program window. The program opens an inset that details the connections to that device, the audio level, the frequency of the video signal input from or output to that device, and, for the CrossPoint switchers only, the switching interval (RGB delay). See the inset box in figure 5-6.

HINT You can print a map of the current configuration by clicking **File > Print Tie Map**.

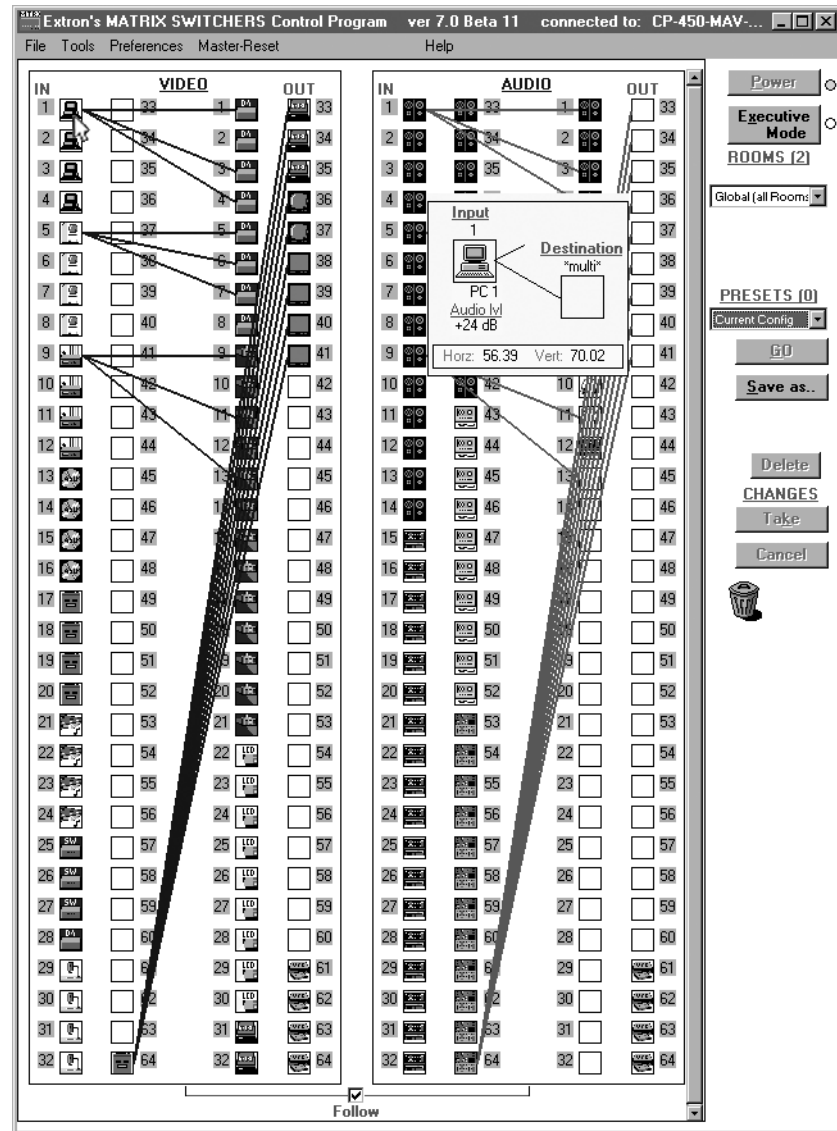


Figure 5-6 — Sample program window, with ties and icons

IP Settings/Options window

The IP Settings/Options window (figure 5-7), accessible by clicking **Tools > IP options**, provides a location for viewing and, if connected via either serial port or if you are logged on via the Ethernet port as an administrator, editing settings unique to the Ethernet interface. See appendix A, “Ethernet Connection”, for basic information about IP addresses. None of the fields on this screen can be edited while you are logged on as a user.

IP Settings / Options

Matrix IP Address: 192.168.254.254 Extron Name/Descriptor: CP-450-MAV-Plus-04-7D-01

Gateway IP Address: 192.168.0.0 Subnet Mask: 255.255.0.0

Hardware Address: 00-05-A6-04-7D-01 ☐ Use DHCP (Obtain an IP address automatically)

Date: Wed, 02 Sep 2009 Time (local): 06:55:22 Sync time to PC GMT: -08:00 ☒ Use Daylight Saving

Administrator Password: admin User Password: user

Mail Server

IP Address: 192.168.2.25 Domain Name: folklore.net

E-mail Addressee	None	Fail	Fixed	Both	Missing Input(s)	Fans	Power Supply
1 Jsmith@folklore.net	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2 Pocahontas@folklore.net	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 Mstandish@folklore.net	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Send test E-mail

This PC is: 10.1.4.48 (PROGRAMMER) Cancel Take

Figure 5-7 — Control program IP Setting/Options window

NOTE Editing variables in the IP Settings/Options window while connected via the Ethernet port can immediately disconnect the user from the switcher. Extron recommends editing the settings on this screen using the either serial port and protecting the Ethernet access to this screen by assigning an administrator's password to qualified and knowledgeable personnel only.

NOTE When the control program is connected to the switcher via a serial port, the Administrator and User Password fields are not masked. If a password has been inadvertently changed to an unknown value, you can look up and, if desired, change a password in this window without knowing the current password.

Address and Name fields

The **Matrix IP Address** field contains the IP address of the connected matrix switcher. This value is encoded in the flash memory in the switcher.

The **Gateway IP Address** field identifies the address of the gateway to the controlling PC to be used if the matrix switcher and the mail server are not on the same subnet.

The **Subnet Mask** field is used to determine whether the matrix switcher is on the same subnet as the controlling PC when you are subnetting. For more information, see “Subnetting — A Primer”, in appendix A, “Ethernet Connection”.

NOTE *The above fields are unavailable for editing when DHCP is selected.*

NOTE *Editing the above fields while connected via the Ethernet port can immediately disconnect the user from the switcher. Extron recommends editing this field using one of the RS-232 ports and protecting the Ethernet access by assigning an administrator’s password to qualified and knowledgeable personnel only.*

The **Mail Server IP Address** field displays the IP address of the mail server that handles the e-mail for the facility in which the matrix switcher is installed.

Valid addresses consist of four 1-, 2-, or 3-digit numeric subfields, properly called octets, separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeroes, up to 3 digits total per field, are optional. Values of 256 and above are invalid.

The default addresses are as follows, but if these conflict with other equipment at your installation, you can change the addresses to any valid value:

- | | | | |
|---------------|-----------------|-------------------|---------|
| • IP address | 192.168.254.254 | • Gateway address | 0.0.0.0 |
| • Subnet mask | 255.255.0.0 | | |

The **Extron Name/Descriptor** field contains the name of the matrix switcher. This descriptor can be changed to any valid name, up to 12 alphanumeric characters.

NOTE *The following characters are invalid in the Extron Name/Descriptor field: {space} + ~ , @ = ' [] { } < > ' " ; : | \ and ?.*

The **Mail Server Domain Name** field displays the domain name that the matrix switcher uses to log on to the e-mail server. Standard domain conventions (such as xxx.com) apply.

NOTE *The following characters are invalid in a domain name: {space} + ~ , = ' [] { } < > ' " ; : | \ and ?. The @ character is only acceptable as the lead-in to the domain name (such as @folklore.net).*

Edit any of these fields as follows:

1. Click in the desired field. The graphic cursor becomes a text cursor.
2. Edit the address or name as desired.
3. Press the Tab key on the keyboard or click in another field to exit the field.
4. Click the **Take** button to make the address change take affect.

Hardware Address field

The hardware (MAC) address is hardcoded in the switcher and cannot be changed.

Use DHCP check box

The **Use DHCP** check box directs the matrix switcher to ignore any entered IP addresses and to obtain its IP address from a Dynamic Host Configuration Protocol (DHCP) server (if the network is DHCP capable). Contact the local system administrator to determine whether to use DHCP.

Date, Time (local), and GMT (offset) fields

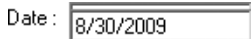
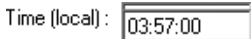
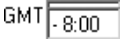
The **Date** field displays the current date in the Greenwich Mean Time zone.

The **Time (local)** field displays the current time in the local time zone.

The **GMT** field displays the amount of time, in hours and minutes, that the local time varies from the GMT international time reference.

NOTE *Rather than the following procedure, you can click the **Sync Time to PC** button to set the switcher to your computer's internal time.*

If desired, adjust any of these values as follows:

1. Click in the desired field. The field changes to an editable field appropriate to the value being change and the graphic cursor becomes a text cursor.
 - The **Date** field becomes a set date field, with the date in the format (M)M/(D)D/YYYY. Leading zeroes are not shown. 
 - The **Time (local)** field becomes a set time field, with the time in the format HH:MM:SS (00:00:00 to 23:59:59). 
 - The **GMT** field becomes a set offset field, with the offset in the format ±HH:MM (−12:00 to +14:00). 
2. Edit the field as desired to set the proper value. For time, remember to use 24-hour time. Leading zeroes are optional.
3. Press the Tab key on the keyboard or click in another field to exit the set date field.
4. Click the **Take** button to make the date change take affect.

Sync Time to PC button

Clicking the mouse on the **Sync Time to PC** button causes the computer you are operating to send its internal time to the switcher in a set time command.

Use Daylight Saving check box

Click in the **Use Daylight Saving** check box to turn Daylight Saving Time on and off for North America. When Daylight Saving Time is turned on, the switcher automatically updates its internal clock between Standard Time and Daylight Saving Time in the spring and fall on the date that the time change occurs in North America. When Daylight Saving Time is turned off, the switcher does not adjust its time reference.

NOTE *For Daylight Saving Time in Europe and Brazil, refer to the "Set Daylight Saving Time" SIS command on page 4-22.*

Administrator Password and User Password fields

The Administrator Password field displays the password required to log on to the matrix switcher via the Ethernet port with all of the administrator's rights and privileges. The User Password field displays the password required to log on to the matrix switcher via the Ethernet port as a user, without all of the administrator's rights and privileges. Passwords are case sensitive and are limited to 12 upper-case and lower-case alphanumeric characters.

While you are logged on as a user, both password fields are masked with asterisks (*****) as a security measure.

NOTE *Editing the Administrator Password field while connected via the Ethernet port can immediately disconnect the user from the switcher. Extron recommends editing this field using either serial port and protecting the Ethernet access to this screen by assigning an administrator's password to qualified and knowledgeable personnel only.*

NOTE *An administrator password must be created before a user password can be created.*

NOTE *The following characters are invalid in passwords:
{space} + ~ , @ = ' [] { } < > ' " ; : | \ and ?.*

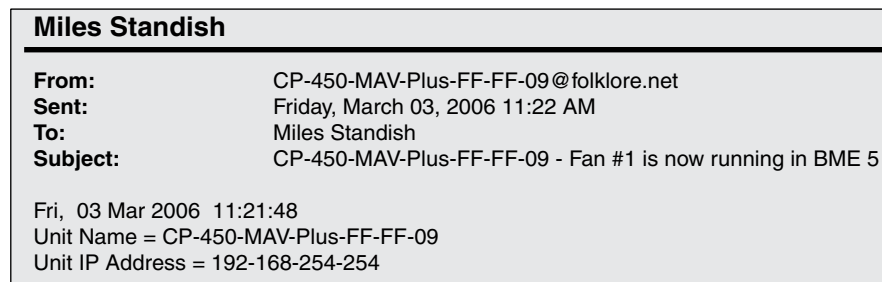
Edit either password field as follows:

1. Click in the desired Password field. The pointer tool becomes a text cursor.
2. Edit the case-sensitive password as desired.
3. Press the Tab key on the keyboard or click in another field to exit the Password field.
4. Click the **Take** button to make the password change take effect.

Matrix Software, cont'd

E-mail Addressee fields

The eight E-mail Addressee fields permit the administrator to identify the e-mail addresses of the personnel to whom the matrix switcher e-mails notification of its failure and repair status. The following figure shows a typical e-mail from the switcher.



The radio buttons and check boxes associated with each address field permit the administrator to specify e-mail requirements for each recipient.

Edit these fields and controls as follows:

1. Click in the desired E-mail Addressee field. The pointer tool becomes a text cursor.
2. Edit the e-mail address as desired. Standard e-mail address conventions apply (for example: *nnnnn@xxx.com*).
3. Press the Tab key on the keyboard or click in another field to exit the e-mail addressee field.
4. In the square check boxes associated with each addressee, select one or more options about which the addressee is to be e-mailed: missing input(s), fans, and power supply. In the floating box that contains the input numbers, select the inputs to be monitored.
5. In the round radio buttons associated with each addressee, select whether the addressee is to be e-mailed of failures, fixes, both, or not be notified. The **None** radio button is useful for temporarily removing personnel from the e-mail list when they are unavailable, such as on travel or vacation.
6. If desired, click on the **Send test E-mail** button to test the e-mail function.
7. Click on the **Take** button to make the e-mail address changes take effect.

Updating firmware

The firmware upgrade utility provides a way to replace the firmware that is coded on the switcher's control board without taking the switcher out of service.

Update the switcher firmware as follows:

1. Visit the Extron Web site, www.extron.com, click the **Download** tab, and then click the **Firmware** link (figure 5-8).

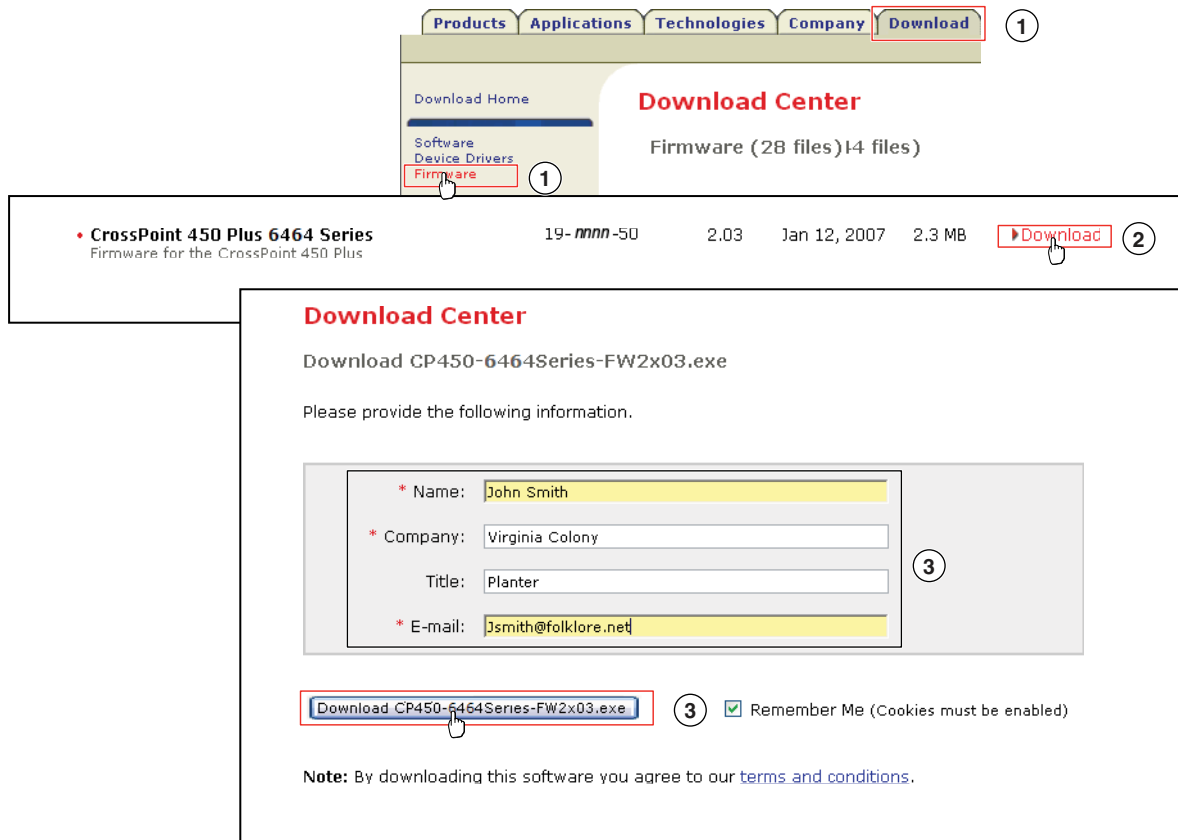


Figure 5-8 — Location of firmware upgrade files

2. Select the appropriate firmware file to download and click **Download**.
 3. Enter the requested personal information and then click **Download** to copy the firmware to your computer.
 4. Click **Run** twice (figure 5-9 on the next page). The PC downloads the firmware update from the Extron Web site and starts the Extron Installation Program to extract the firmware file.
 5. Click **Next**. The program extracts the firmware files and places them in a folder identified in the InstallShield Wizard window.
- NOTE** Note the folder to which the firmware file is saved.
6. Click **Finish** to exit the program.

Matrix Software, cont'd

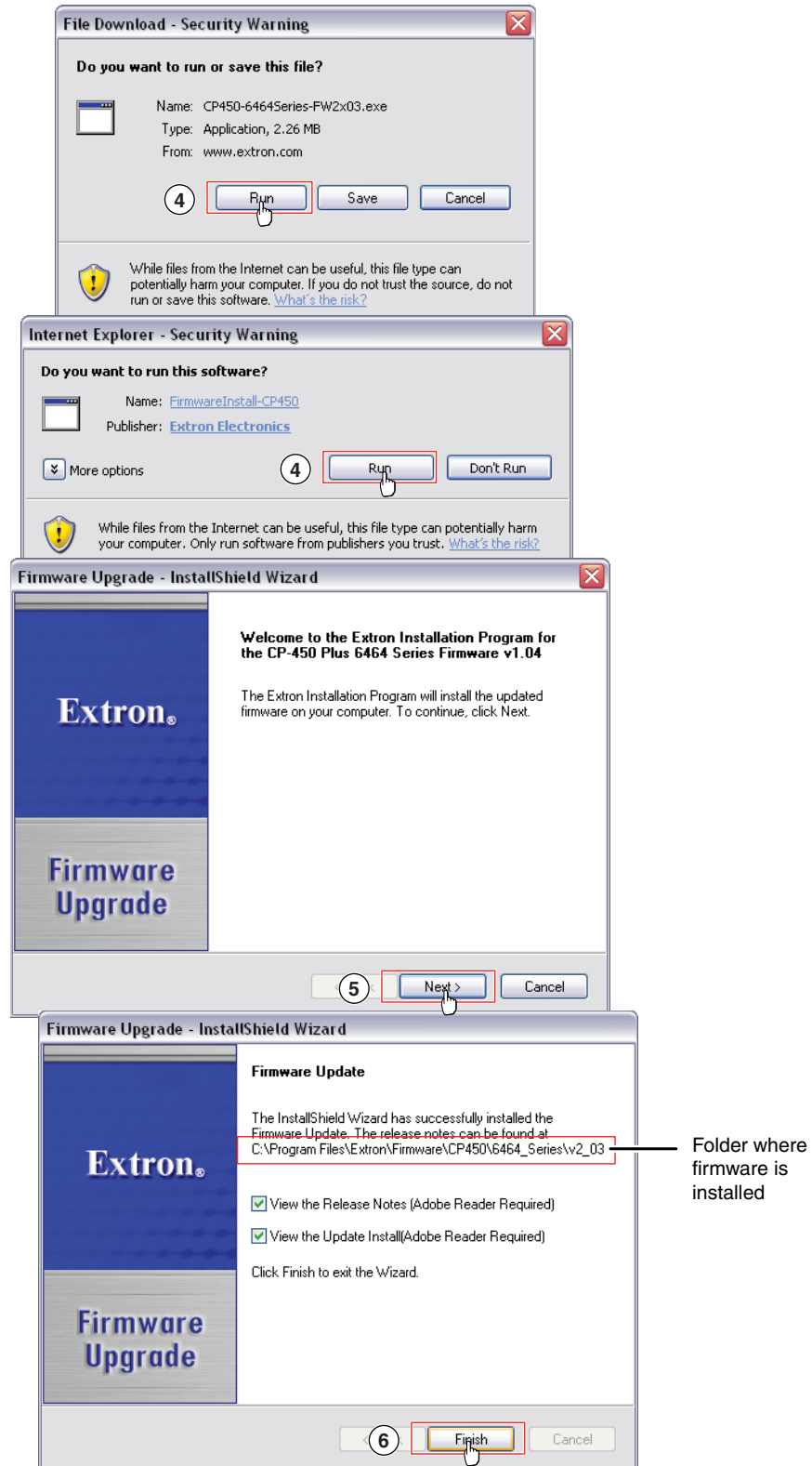


Figure 5-9 — Downloading firmware upgrade files

7. Connect a Windows-based computer to either switcher serial port or the switcher LAN port. See chapter 2, “Installation”, for more details.
8. Start the Matrix Switchers Control Program and connect to the matrix switcher. See “Using the Matrix Switcher Control software” in this chapter, steps 1 through 4, starting on page 5-4.
9. Click **Tools > Update** firmware.

If you are connected via the LAN port, the Select Files window appears (figure 5-10). See “Ethernet-connected firmware upload”, below.

If you are connected via either serial port, either the Add Device window (figure 5-11) or the Extron Firmware Loader (figure 5-12) appears. See “Serial-port-connected firmware upload”, on the next page.

Ethernet-connected firmware upload

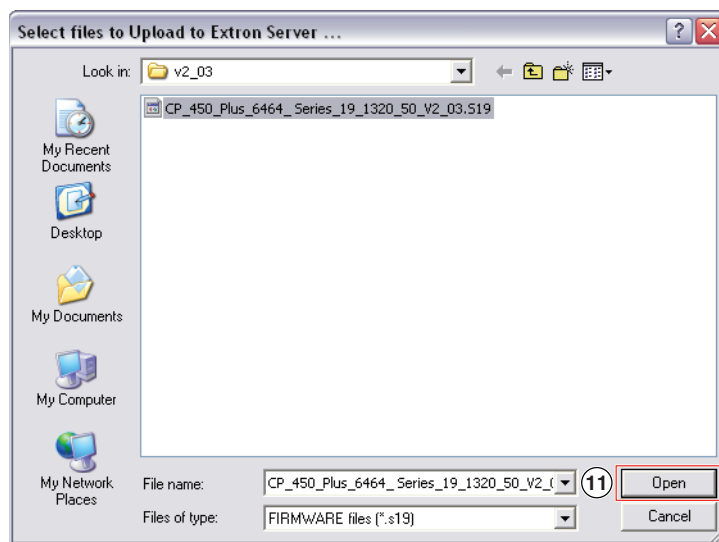


Figure 5-10 — Select files window

10. Navigate to the folder where you saved the firmware upgrade file. Select the file.

NOTE Valid firmware files must have the file extension .S19. Any other file extension is not a firmware upgrade.

NOTE The original factory-installed firmware is permanently available on the matrix switcher. If the attempted firmware upload fails for any reason, the switcher reverts to the factory-installed firmware.

11. Click the **Open** button. The software advises you that you are about to reprogram the switcher’s firmware. Click **OK** to continue.

A status window, which shows the progress of the upload, appears. The firmware upload to the matrix switcher may take a few minutes.



Matrix Software, cont'd

Serial-port-connected firmware upload

10. If the Firmware Loader (figure 5-12) appeared, proceed to step 14.

If you have not updated firmware for the matrix switcher before, and if the Add Device window (figure 5-11) appears, select the **RS-232** tab.

If you have updated firmware for this model in the past, click **Cancel**. The Firmware Loader window appears. Proceed to step 14.

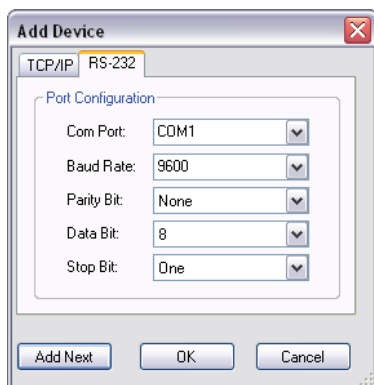


Figure 5-11 — Add Device window

11. From the drop-down menus on the RS-232 screen, select the appropriate Com port number (obtained from your system administrator) and baud rate (the default is 9600).
12. Click **OK**. The Firmware Loader window appears (figure 5-12).

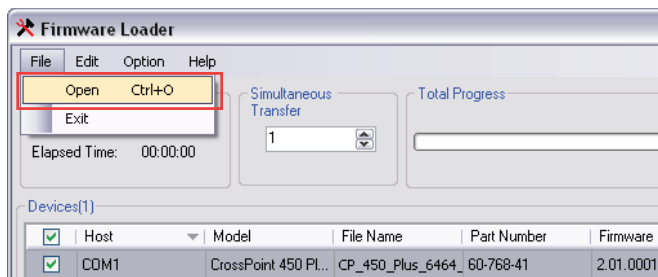


Figure 5-12 — Extron Firmware Loader window

13. Select the matrix switcher and click **File > Open**. The Choose Firmware File screen appears (figure 5-13).

14. Navigate to and select the new firmware file. The Choose Firmware File window closes.

NOTE When downloaded from the Extron Web site, the firmware is placed in a subfolder of C:\Program Files\Extron\Firmware.

CAUTION The firmware file must have a .s19 extension. Other file types can cause the switcher to stop functioning.

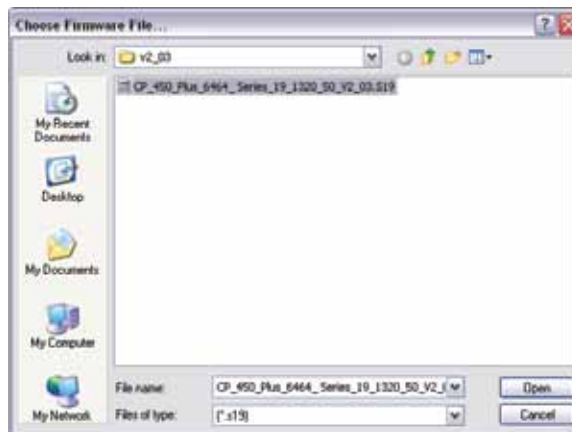


Figure 5-13 — Choose Firmware File window

15. In the Firmware Loader window, click **Begin**.

The Total Progress and Progress status bars show the progress of the upload. The firmware upload to the switcher may take several minutes. Once the status bars have progressed from 0% to 100%, and Status is listed as Complete, the firmware loader utility resets the switcher.

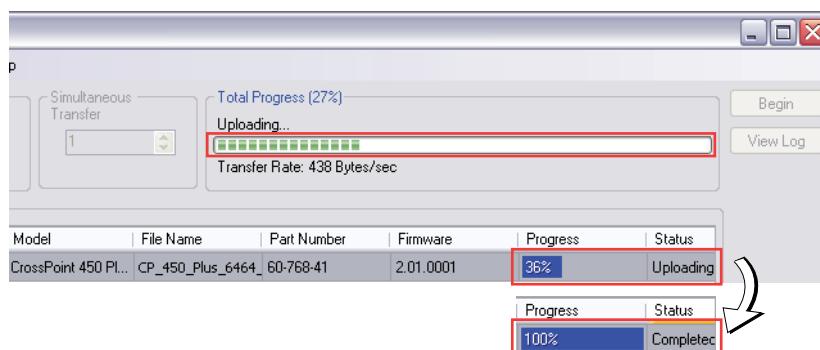


Figure 5-14 — Firmware Loader screen

16. Click **Exit** to close the Firmware Loader.

Uploading HTML files

You can create customized HTML pages for the switcher to display. The HTML Files List window (figure 5-15), accessible via the Tools menu, provides a way to view the contents of the switcher's file system and upload custom HTML pages to the switcher.

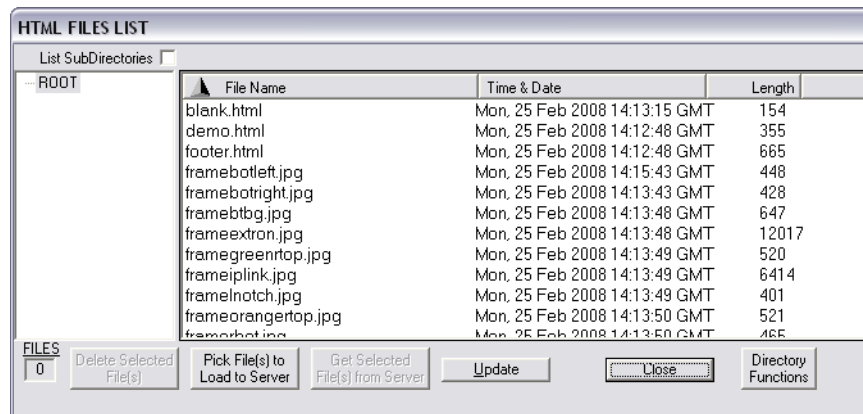


Figure 5-15 — HTML Files List window

Upload HTML pages as follows:

NOTE The files listed in figure 5-15 are shown for example only and may not be present on your switcher.

NOTE The HTML Files List window is for inserting your own HTML pages. This is **not** the window to replace the firmware that controls all switcher operation. See “Updating firmware”, earlier in this chapter, to replace the firmware.

NOTE The following characters are invalid in file names:
{space} + ~ , @ = ' [] { } < > ' " ; : | \ and ?.

1. Connect the PC to the matrix switcher via the switcher's RS-232/RS-422 port or Ethernet port.
2. Start the Matrix Switchers Control Program and connect to the matrix switcher. See “Using the Matrix Switcher Control software” in this chapter, steps 1 through 4, starting on page 5-4.
3. Click on **Tools > HTML File Manager**. The HTML Files List window appears.
4. Click the **Pick File(s) to Load to Server** button. An open file window appears.
5. Navigate to the folder where you saved the HTML file(s). Select the file(s).

NOTE To select multiple files, hold the Ctrl key while you select the desired files.

NOTE If you want one of the HTML files that you created to be the default start-up page, name the file “index.html”. The matrix switcher looks for that file name when you first connect to it using an Internet browser.

6. Click the **Open** button. The file(s) upload to the matrix switcher may take a few minutes.
7. Click the **Update** button to confirm the upload.
8. Click the **Close** button to exit the HTML Files List window.

Windows buttons, drop boxes, and trash can

The buttons, drop boxes, and trash can on the right side of the Matrix Switchers Control Program window perform the following functions:

Power — Unavailable for matrix switchers, because the switcher power cannot be controlled via software.

Executive Mode — Allows you to lock out front panel operations, except for the view-only mode functions. Click the button to cycle between *Lock* mode 0 (the indicator is white), *Lock* mode 1 (the indicator is red), and *Lock* mode 2 (the indicator is orange).

NOTE See “Setting the front panel locks (Executive modes)” in chapter 3, “Operation” for more information on the Lock modes.

Rooms menu — Displays a list of up to 10 rooms. You can select a room from the list to display it in the window.

NOTE A *Room* is a subset of outputs that are logically related to each other, as determined by the operator. The matrix switcher supports up to 10 rooms, each of which can consist of from 1 to 16 outputs.

Presets menu — Displays a list of up to 64 global presets and up to 100 room presets (10 rooms with 10 presets per room). You can select a preset from the list to display it in the window and either activate it (**Go**) or delete it (**Delete**).

Go — Activates the selected preset as the current configuration.

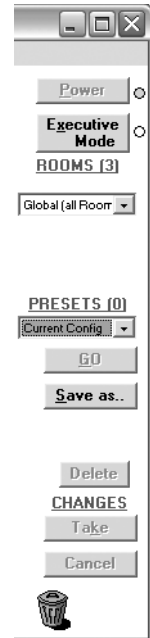
Save as ... — Allows the current set of ties to be saved as a preset. Enter the preset number when prompted to do so.

Delete — Allows the current preset to be deleted.

Changes – Take — Allows you to save to file any changes made to the displayed configuration.

Changes – Cancel — Returns to the previous screen, undoing any changes you have made.

Trash can — Drag and drop from an input or output button to the trash can to erase all ties associated with that input or output.



Windows menus

File menu

Save Matrix settings as ... — Saves a complete set of up to 64 global presets and 100 room presets, plus the last active setting (preset #0), to a file. Saved settings include assigned icons and icon captions.

Restore Matrix settings from ... — Loads and activates settings from a previously saved file.

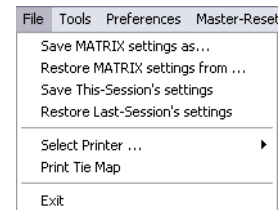
Save This-Session's settings — Same as **Save Matrix settings as ...**, but without specifying a file name.

Restore Last-Session's settings — Loads the ties, icons, and icon captions that were saved during the last session.

Select printer — Selects the target printer.

Print tie map — Prints the tie set that is displayed on the screen.

Exit — Closes the Matrix Switchers Control Program.



Tools menu

Assign Device Icons — Displays the complete set of input and output device icons. You can drag any of these icons to the input and output boxes.

Edit Device Palette — Allows you to add your own device icon graphics.

RGB delay settings — Displays the switching interval setting for each input and allows you to change them.

Audio-Input gain settings — Displays the audio gain level setting for a single input or for all inputs and allows you to change it. The level is expressed as the magnitude (number of decibels) and polarity (positive [gain] or negative [attenuation]) of the audio adjustment.

Audio-Output volume settings — Displays the audio output level setting for a single input or for all inputs and allows you to change it. The level is expressed as a percentage of the input audio volume that is applied to the output; 0% is full attenuation (audio is silent), 100% is full volume.

Mute-Output settings — Displays the RGB Delay, Volume, and Mute Adjust screen, which allows you to mute and unmute individual or all video or audio outputs.

View input frequencies — (DSVP) Displays the input horizontal and vertical frequencies for each input.

Update Firmware — Allows you to replace the firmware that is coded on the switcher's control board without taking the switcher out of service, opening the switcher enclosure, and replacing the firmware chip set. See "Updating firmware" on page 5-12.

IP options — Allows you to set IP options. See "IP Settings/Options window" on page 5-8.

HTML file manager — Displays a list of HTML files installed on the switcher and allows you to upload custom files from a connected PC to the switcher. See "Uploading HTML files" on page 5-18.

Tools	Preferences	Master-Reset
Assign Device Icons		
Edit Device Palette		
RGB Delay settings		
Audio-Input Gain settings		
Audio-Output Volume settings		
Mute-Output settings		
View Input Frequencies		
Update Firmware ...		
IP Options		
HTML File Manager		
Hardware Status		
Name Presets		
Show RS-232 Strings		
I/O Group settings		
Room configuration		
Initialize ...		

Hardware status — Provides an overall view of the status of the matrix switcher, including the power supply voltages, the temperature status, the Remote RS-232/RS-422 port configuration, and the installed and updated firmware status (figure 5-16).

The screenshot shows a window titled "Status for BME 0: 6464 series Wideband BME (64 X 64) w/ Front-Panel Controller". It is divided into several sections:

- Hardware Status:**
 - Power Supplies:**
 - primary: +5 Volts = 4.96, -5 Volts = -4.95
 - secondary: +12 Volts = n/a, -12 Volts = n/a
 - Fans:**
 - left: +5 Volts = 4.96, +3.3 Volts = 3.29
 - right: +12 V Fan = 11.40
 - Temperature:** = 106.0 F / 41.1 C
- Serial Port Configuration:**
 - Port Type = RS-232
 - Baud Rate = 9600
 - Data Bits = 8
 - Parity = N
 - Stop Bits = 1
- Firmware Version:** 1.01, **Kernel Version:** 1.79, **Firmware Loaded/Updated:** Tue, 01 Sep 2009 21:29:18 GMT
- Events Running:** 0
- Open IP connections:** 15
- BME Selection:** Radio buttons for 0, 1, 2, 3, 4. BME 0 is selected.
- Legend:**
 - Green square = Installed /Working
 - Red square = Failed
 - White square = Not Installed

☒ = Installed /Working Green — Proper operation.
☐ = Failed Red — Component has failed.
☐ = Not Installed White — Component is not installed.

Figure 5-16 — Status window

Name presets — Allows you to assign a name to each of the 64 global memory presets and 100 room presets.

NOTE Preset names are limited to 12 upper- and lower-case alphanumeric characters, space, and the _ and / characters.

NOTE The following characters are invalid in preset names:
+ ~ , @ = ' [] { } < > ' " ; : | \ and ?.

Show RS-232 Strings — Displays the ASCII commands that are used by the current configuration. You can refer to these for SIS programming.

I/O group settings — Allows you to establish I/O groups.

Room configuration — Allows you to assign outputs to rooms or delete outputs from rooms.

NOTE A Room is a subset of outputs that are logically related to each other, as determined by the operator. The matrix switcher supports up to 10 rooms, each of which can consist of from 1 to 16 outputs.

Initialize — Initializes and clears any or all of the following: ties, presets, preset names, icon names, and icons.

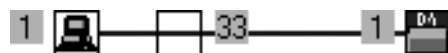
Matrix Software, cont'd

Preferences menu

Immediate Changes — Causes configuration changes to take effect immediately.

Hold/Verify Changes — Delays implementation of configuration changes until the Changes – **Take** button is pressed.

Ties as Lines — Displays ties as lines (below).



Ties as Crosspoints — Displays ties as a matrix of inputs and outputs (figure 5-17). Ties that have been made are indicated as **amber** or **green** boxes. Ties that will take effect when you click the **Take** button are indicated by +. Ties that will be broken when you click the **Take** button are indicated by –.

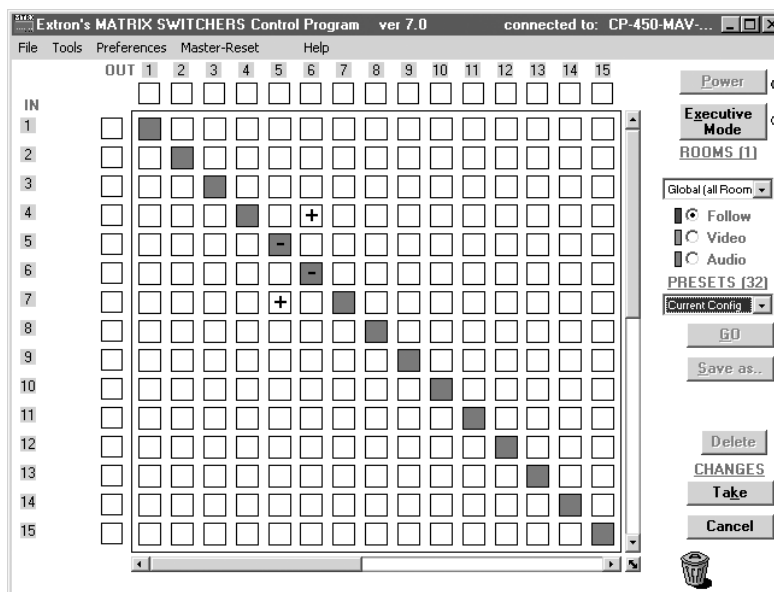
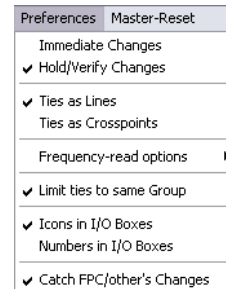


Figure 5-17 — Ties shown as crosspoints

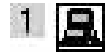
Frequency-read options (CrossPoint only) — Allows you to set the input signal detection (DSVP) feature as follows:

- To never sample and display the sync or no sync status (select **None**)
- To automatically refresh the display (select **Automatically every 10 seconds**)
- To sample the sync and update the display whenever you make a configuration change (select **On demand or by refresh**).

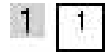
Limit ties to same group — Allows you to limit the creation of ties using the program to inputs and outputs that are in the same group (similar to front panel operation).



Icons in I/O Boxes — Erases any numbers in the I/O boxes in the Control Program window (figure 5-6). You can place icons in the boxes.



Numbers in I/O Boxes — Erases any icons in the I/O boxes in the Control Program window and fills each box with the associated input or output number.



Catch FPC/others changes — When checked, sets the switcher to report all configuration and setting changes to the serial port or Ethernet connection that turned this selection on. These reports allow the Matrix Switchers Control Program to track the changes that occur in the switcher's configuration and settings, whether commanded via the front panel, either serial port, or the Ethernet port.

Master-Reset selection

Master-Reset

Master reset performs all of the following functions:

- Clears all ties
- Clears all presets
- Clears all output mutes
- Resets all I/O grouping
- Sets all input audio levels to 0 dB
- Sets all output audio levels to 0 dB attenuation (100 percent)

NOTE *Master reset does not reset the Internet protocol (IP) settings.*

Matrix Software, cont'd

Using *Emulation* mode

Emulation mode allows you to set up the software without connecting the switcher to the computer. To use *Emulation* mode, do the following:

1. Start the Matrix Switcher Control Program.
2. Choose **Emulate**, and click **OK**.
3. Choose an emulation file to open, and click **OK**. The file DEMO.MTX provides a sample of a completed matrix setup. Selecting the file NEW.INI or clicking **Cancel** provides a blank setup to get you started.
4. Enter the file name under which you want to save any changes to the file, and click **OK**.
5. Select **6464 Series**, the matrix size, and the number of video planes (video format) and audio planes (**None** or **1** or **2**), for which you are preparing a configuration (figure 5-18), and click **OK**.

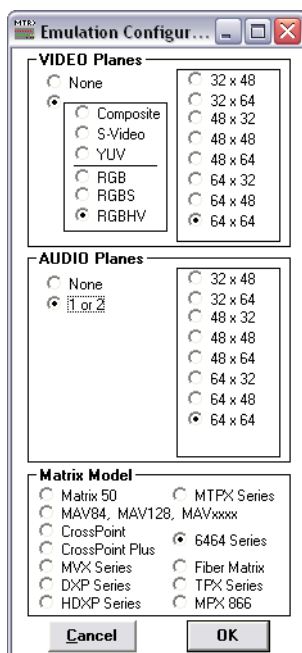


Figure 5-18 — Emulation mode configuration

6. Continue using the program as described on page 5-6.

Using the help system

For information about program features, you can access the help program in any of the following ways:

- From the Extron Electronics program folder or group, double-click the MATRIX Switcher Help icon (shown at right).
- From within the Matrix Switchers Control Program, select from the Help menu on the main screen.
- From within the Matrix Switchers Control Program, press the F1 key.



Button Label Generator Program

The Button Label Generator software creates labels that you can place in the translucent covers above and below the input and output pushbuttons. You can create labels with names, alphanumeric characters, or even color bitmaps for easy and intuitive input and output selection. See Appendix B, “Reference Information”, for the procedure for removing and replacing the translucent covers.

Installing the Button Label Generator software

The Extron Button Label Generator is available on the Extron Web site, www.extron.com, under the Download tab. Click the **Software** link (figure 5-19), and download and install the program.



Figure 5-19 — Location of software on the web site

NOTE The Button Label Generator software is also included on the Extron Software Products disk that accompanied the switcher.

By default, the Windows installation creates a C:\Program Files\Extron\ButtonLabelGenerator directory and places the Button Label Generator icon into a group or folder named “Extron Electronics”.

Matrix Software, cont'd

Using the Button Label Generator software

1. To run the Button Label Generator program, click **Start > Programs > Extron Electronics > Button Label Generator > Button Label Generator**. The Button Label Generator window appears (figure 5-20).

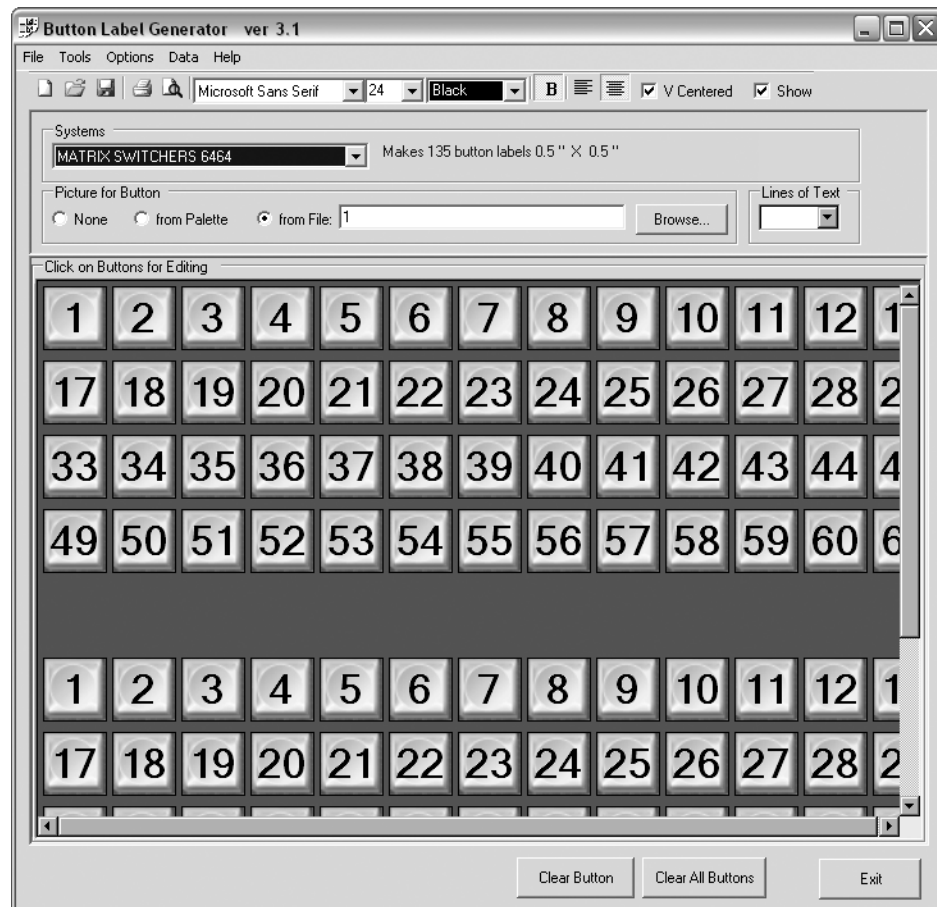


Figure 5-20 — Button Label Generator window

2. In the Systems selection box, choose the Matrix Switchers 6464 option to match the button label size and quantities for your matrix switcher.
3. Using standard Windows controls, you can create and print labels that can be placed in the clear button caps on the front panel of the switcher.
4. Click the **Clear All Buttons** button and create new labels as many times as necessary to make all of the button labels that you need.

To access the help program, click the Help menu.



CrossPoint 450 Plus and MAV Plus Switchers

Chapter Six

HTML Operation

Downloading the Startup Page

Status Tab

Configuration Tab

File Management Tab

Control Tab

Special Characters

HTML Operation

The switcher can be controlled and operated through BME 0's LAN port, connected via a LAN or WAN, using a Web browser such as Microsoft® Internet Explorer®. The browser's display of the switcher's status or operation has the appearance of Web pages. This chapter describes the factory-installed HTML pages, which are always available and cannot be erased or overwritten.

NOTE *If your Ethernet connection to the matrix switcher is unstable, try turning off the proxy server in your Web browser. In Microsoft Internet Explorer, click **Tools > Internet Options > Connections > LAN Settings**, uncheck the **Use a proxy server...** box, and then click **OK**.*

Downloading the Startup Page

Access the switcher using HTML pages as follows:

1. Start the Web browser program.
2. Click in the browser's Address field.
3. Enter BME 0's Matrix IP address in the browser's Address field.

NOTE *If the local system administrators have not changed the value, the factory-specified default, 192.168.254.254, is the correct value for this field.*

4. If you want the browser to display a page other than the default page (such as a custom page that you have uploaded), enter a slash (/) and the file name to open.

NOTE *The browser's Address field should display the address in the following format: xxx.xxx.xxx.xxx/{optional_file_name.html}*

NOTE *The following characters are invalid in file names: {space} + ~ , @ = ' [] { } < > ' " ; : | \ and ?.*

5. Press the keyboard Enter key. The switcher checks to see if it is password protected.

If the switcher is not password protected, it checks and downloads the HTML pages (proceed to step 7).

If the switcher is password protected, the switcher downloads the Enter Connect To page (figure 6-1).

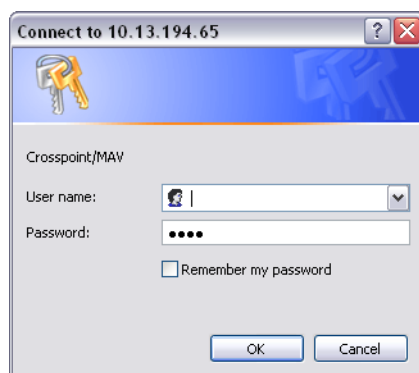


Figure 6-1 — Connect To page

NOTE *A User name entry is not required.*

6. Click in the **Password** field and type in the appropriate administrator or user password. Click the **OK** button.

7. The switcher checks several possibilities, in the following order, and then responds accordingly:
 - a. Does the address include a specific file name, such as 10.13.156.10/file_name.html? **If so**, the switcher downloads that HTML page.
 - b. Is there a file in the switcher's memory that is named "index.html"? **If so**, the switcher downloads "index.html" as the default startup page.
 - c. **If neither of the above conditions is true**, the switcher downloads the factory-installed default startup page, "nortxe_index.html" (figure 6-2), also known as the System Status page.

Status Tab

System Status page

The System Status page (figure 6-2) provides a status report for all BMEs in the matrix switcher system, including the primary and secondary power supply status, the individual voltages, the fan status (if applicable), and the operating temperature. The System Status page is the default page that the switcher downloads when you connect to the switcher. Access the System Status page from other pages by clicking the **Status** tab.

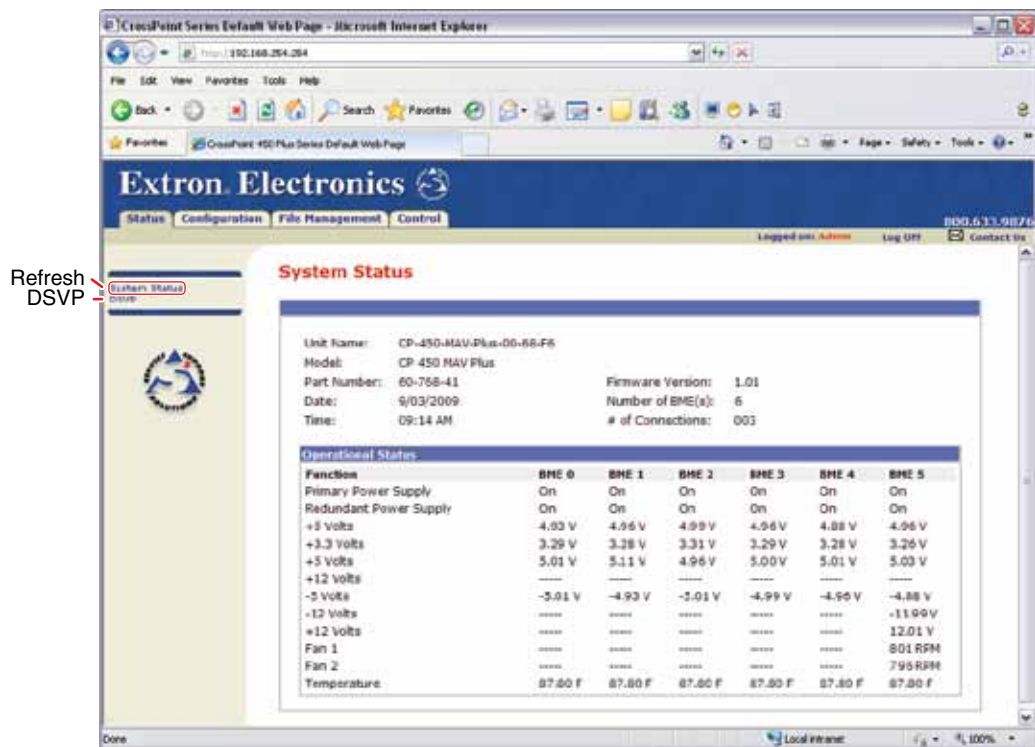


Figure 6-2 — System Status page

The System Status page automatically updates itself every thirty seconds to reflect the latest status of the switcher components.

If a component fails or becomes disconnected, the display shows the change in status the next time it updates.

HTML Operation, cont'd

DSVP page (systems with a sync BME only)

You can view a snapshot-in-time of the input frequencies of connected inputs on the Digital Sync Validation Processing (DSVP) page (figure 6-3). Click the **DSVP** link to the left of the Status page to download the DSVP page.

The DSVP page automatically updates itself every 30 seconds to show the latest input frequencies changes or if an input has been disconnected.

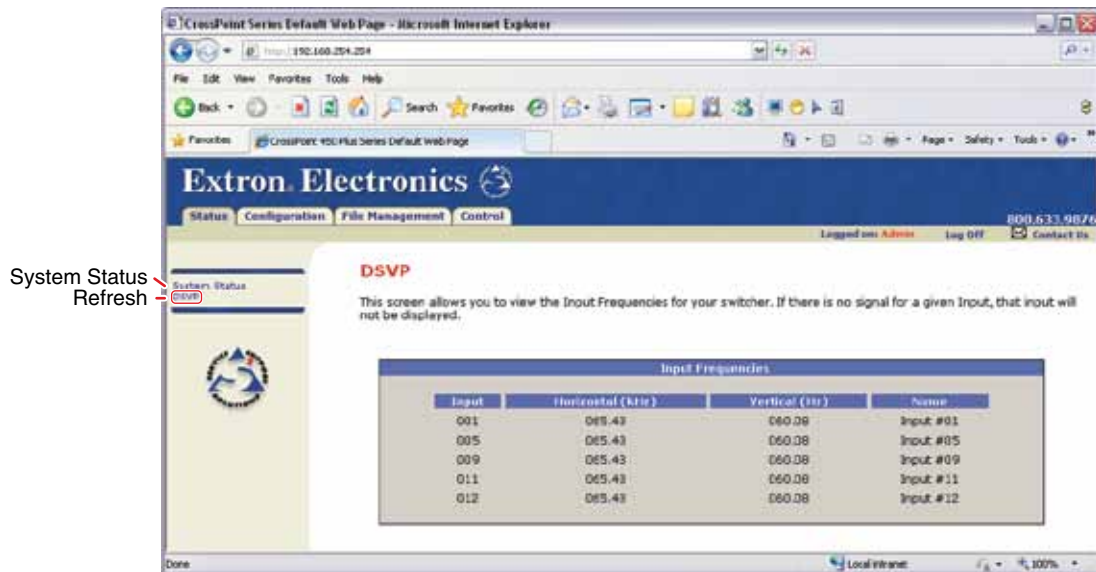


Figure 6-3 — DSVP page

The DSVP page automatically updates itself every 30 seconds to show the latest input frequencies changes or if an input has been disconnected.

Configuration Tab

System Settings Page

The switcher BME 0 downloads the System Settings page (figure 6-4) when you click the **Configuration** tab. The screen consists of fields in which you can view and edit IP administration and system settings. See appendix A, “Ethernet Connection”, for basic information about IP addresses and subnetting.

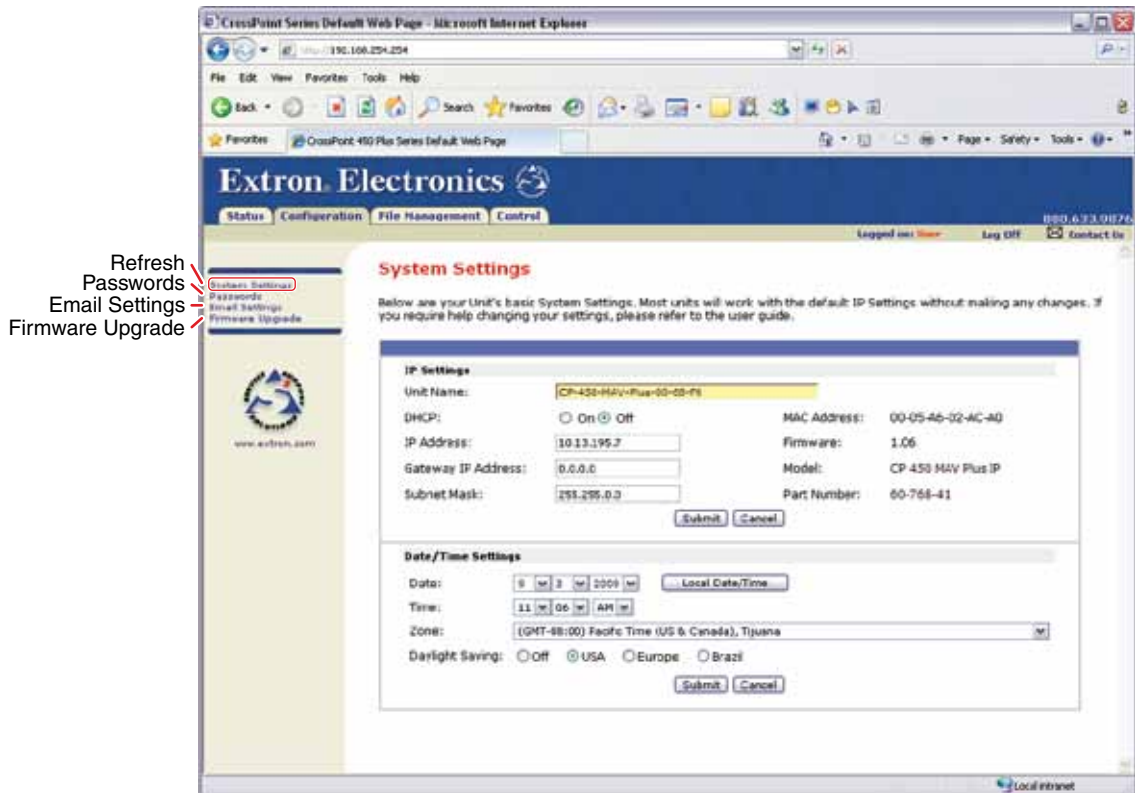


Figure 6-4 — System Settings page

On password-protected connections, there are two levels of protection: administrator and user. Administrators have full access to all switching capabilities and editing functions. Users can create ties, create and recall presets, set video and audio mutes, and view all settings with the exception of passwords.

- Ethernet connection to the switcher, either entering SIS commands (see chapter 4, “Programmer’s Guide”) or using the Extron Matrix Switchers Control Program (see chapter 5, “Matrix Software”) is password protected.
- Serial connection via either RS-232 or RS-422 is **not** password protected.

HTML Operation, cont'd

IP Settings fields

The IP Settings fields provide a location for viewing and editing settings unique to the Ethernet interface. After editing any of the settings on this page, click the **Submit** button at the bottom of the page.

Unit Name field

The Unit Name field contains the name used as the “from” information when the switcher BME 0 e-mails notification of its failed or repaired status. This name field can be changed to any valid name, up to 24 alphanumeric characters.

NOTE *The following characters are invalid in the matrix name:
+ ~ , @ = ' [] { } < > ' " ; : | \ and ?.*

DHCP radio buttons

The **DHCP On** radio button directs the switcher BME 0 to ignore any entered IP addresses and to obtain its IP address from a Dynamic Host Configuration Protocol (DHCP) server (if the network is DHCP capable). The **DHCP Off** radio button turns DHCP off. Contact the local system administrator to determine if DHCP is appropriate.

IP Address field

The IP Address field contains the IP address of the connected switcher BME 0. This value is encoded in the switcher's flash memory.

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric subfields, properly called octets, separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeroes, up to three digits total per field, are optional. Values of 256 and above are invalid.

The factory-installed default address is 192.168.254.254, but if this conflicts with other equipment at your installation, you should ask your network administrator for a new, valid address.

NOTE *IP address changes can cause conflicts with other equipment. Only local system administrators should change IP addresses.*

Gateway IP Address field

The Gateway IP Address field identifies the address of the gateway to the mail server to be used if the switcher BME 0 and the mail server are not on the same subnet. The gateway IP address has the same validity rules as the system IP address.

Subnet Mask field

The Subnet Mask field is used to determine whether the switcher BME 0 is on the same subnet as the mail server when you are subnetting. For more information, see “Subnetting — A Primer”, in appendix A, “Ethernet Connection”.

MAC Address field

The Media Access Control (MAC) Address is hardcoded in the BME and cannot be changed.

Firmware field

The Firmware field identifies the installed firmware version. This field is hardcoded in the BME and cannot be changed.

Model and Part Number fields

The Model and Part Number fields identify the switcher BME 0. These fields are hardcoded in the BME and cannot be changed.

Date/Time Settings fields

The Date/Time Settings fields (figure 6-5) provide a location for viewing and setting the time functions.

The screenshot shows the 'Date/Time Settings' window. The 'Date' field is set to 4/16/2008. The 'Time' field is set to 11:06. The 'Zone' field is set to (GMT-08:00). The 'Daylight Saving' field has 'Off' selected. A 'Local Date/Time' button is located to the right of the date field. A dropdown menu is open for the 'Zone' field, displaying a list of years from 2000 to 2010. Below the dropdown, there are radio buttons for 'Europe' and 'Brazil'. 'Submit' and 'Cancel' buttons are at the bottom right.

Figure 6-5 — Date/Time Settings fields

To sync BME's clock to the connected PC, click the **Local Date/Time** button and then click the **Submit** button.

NOTE Use of the **Local Date/Time** button has no effect on the **Zone** and **Daylight Savings Time** functions.

For more control of the date and time settings, change the settings as follows:

1. Click the desired value's drop box. The adjustable variables are month, day, year, hours, minutes, AM/PM, and (time) zone. A drop-down scroll box appears (the year drop box is selected in figure 6-5).
2. Click and drag the slider or click the scroll up ▲ button or the scroll down ▼ button until the desired value is visible.
3. Click the desired value.

NOTE When setting the time, set the local time. The **Zone** variable allows you to then enter the offset from Greenwich Mean Time (GMT).

NOTE The **Zone** field identifies the standard time zone selected and displays the amount of time, in hours and minutes, that the local time varies from the GMT international time reference.

4. Repeat steps 1 through 3 for other variables that need to be changed.
5. If desired, select the Daylight Saving radio button appropriate for your region or nation.

NOTE When Daylight Saving Time is turned on, the switcher updates its internal clock between Standard Time and Daylight Saving Time in the spring and fall on the date that the time change occurs in the country or region selected. When Daylight Saving Time is turned off, the switcher does not adjust its time reference.

6. Click the **Submit** button.

HTML Operation, cont'd

Passwords page

Access the Passwords page (figure 6-6) by clicking the **Passwords** link on the System Settings page.



Figure 6-6 — Passwords page

The fields on the Passwords page are for entering and verifying administrator and user passwords. Passwords are case sensitive and are limited to up to 12 upper-case and lower-case alphanumeric characters. Each password must be entered twice: once in the Password field and then again in the Re-enter Password field. Characters in these fields are masked by asterisks (*****). If you do not want to password protect an access level, leave the Password field and the Re-Enter password field blank. After entering the desired password in both fields, click the **Submit** button.

NOTE *An administrator password must be created before a user password can be created.*

To clear an existing password so that no password is required, clear any existing password, enter a single space character in the Password and Re-enter Password fields, and click the **Submit** button.

Email Settings page

Reach the Email Settings page (figure 6-7) by clicking the Email Settings link on the System Settings page. The Email Settings page has fields for setting up the switcher's e-mail notification capabilities. For the e-mail settings and for each row of the e-mail notification settings, click the **Edit** button to make the fields available for editing. The button changes to **Save**. After editing the settings associated with the **Edit/Save** button, click the **Save** button.

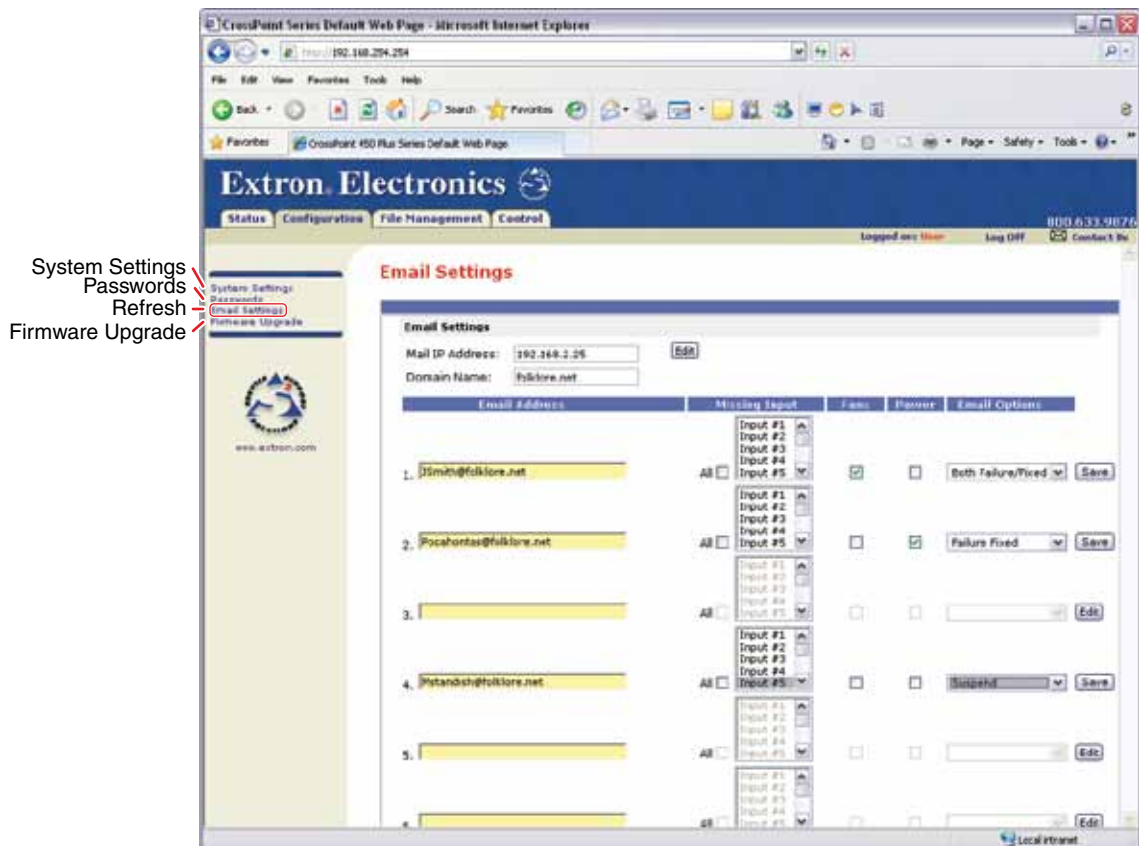


Figure 6-7 — Email Settings page

Mail IP Address field

The Mail IP Address field displays the IP address and the domain name of the mail server that handles the e-mail for the facility in which the switcher BME 0 is installed.

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric octets separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeroes, up to three digits total per field, are optional. Values of 256 and above are invalid.

Domain Name field

The Domain Name field displays the domain name that the CrossPoint or MAV switcher BME 0 uses to log on to the e-mail server. Standard domain name conventions (for example: *nnnnn@xxx.com*) apply.

NOTE The following characters are invalid in a domain name:
{space} + ~ , = ' [] { } < > ' " ; : | \ and ?. The @ character is acceptable only as the lead-in to the domain name (such as *@folklore.net*).

HTML Operation, cont'd

Email address fields

The eight Email Address fields identify the e-mail addresses of the personnel to whom the CrossPoint or MAV switcher BME 0 e-mails notification of its failure and repair status. Standard e-mail address conventions (*nnnnn@xxx.com*) apply.

The check boxes and drop boxes associated with each address field permit the operator to specify criteria under which the BME will e-mail recipients. In the associated Missing Inputs drop boxes, select the inputs to monitor for presence or absence of a signal. Check the Fans and Power boxes to monitor the cooling and power supplies. In the associated **E-Mail Options** drop box, select whether the recipient is to be e-mailed of failures, fixes, or both; not notified; or be removed from the e-mail list. The **Suspend** option is useful for temporarily removing personnel from the e-mail list when they are unavailable, such as on travel or vacation. Deleting an e-mail addressee and clicking the **Submit** button removes the recipient from e-mail notification completely.

Firmware Upgrade page

The Firmware Upgrade page provides a way to replace the firmware that is coded on each BME's control board without taking the switcher out of service. Access the Firmware Upgrade page (figure 6-8) by clicking the **Firmware Upgrade** link on the System Settings page.

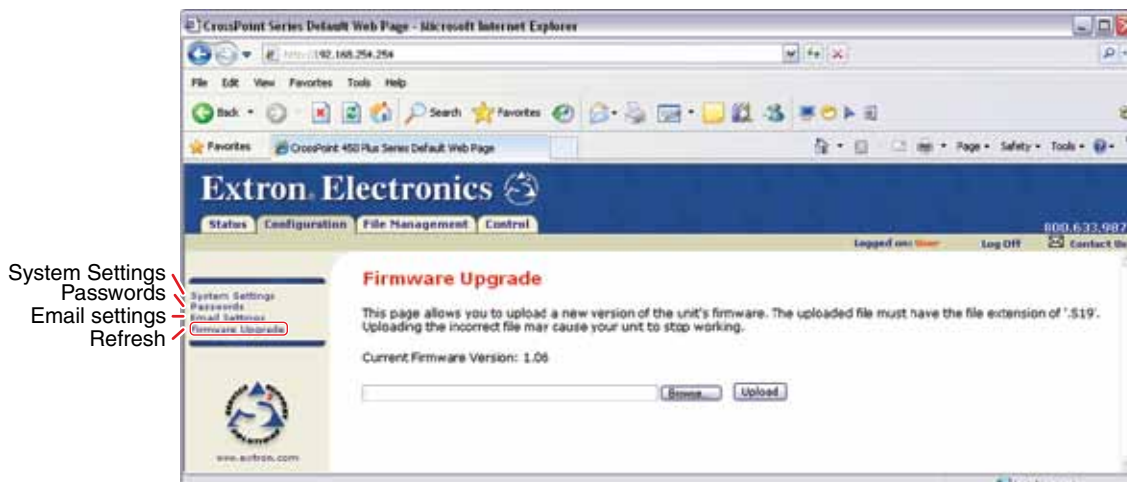


Figure 6-8 — Firmware Upgrade page

Update the firmware for each BME as follows:

NOTE The Firmware Upgrade page is **only** for replacing the firmware that controls all switcher operation. To insert your own custom HTML pages, see “File Management Page”, on page 6-12.

1. Visit the Extron Web site, www.extron.com, select the CrossPoint 450 Plus/ MAV Plus product category, select the latest firmware installation package (*.exe file) for the switcher, and download the file. Note the folder to which you save the firmware file.
2. Run the executable (*.exe) file to decompress the firmware file.
3. Connect the PC to the matrix switcher BME via the switcher's LAN port.
4. Access the matrix switcher BME using HTML pages.
5. Click the **Configuration** tab.

- Click the **Firmware Upgrade** link (figure 6-9).

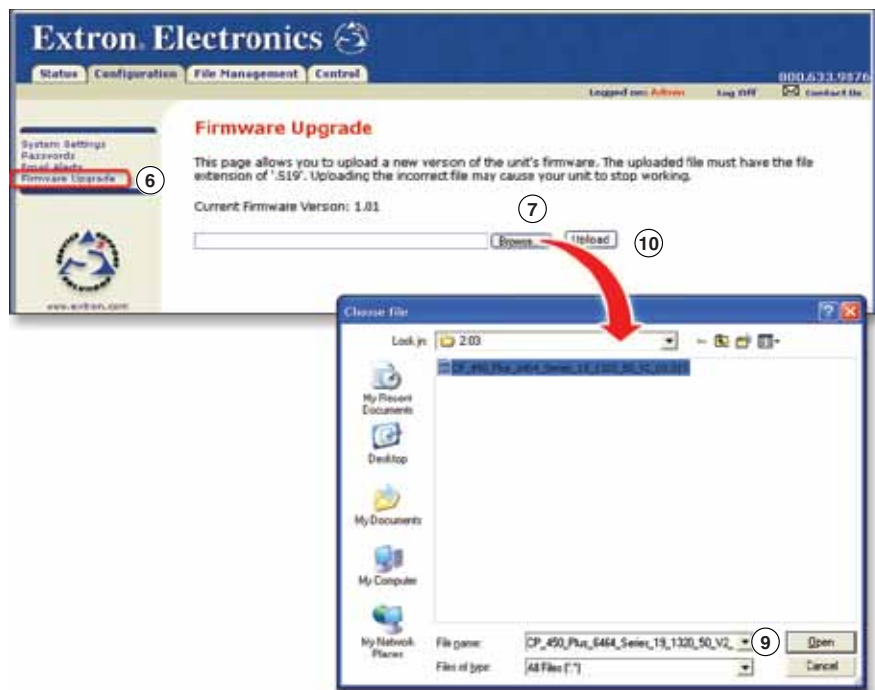


Figure 6-9 — Firmware upgrade

- Click the **Browse** button. A Choose File window appears.
- Navigate to the folder where you saved the firmware upgrade file. Select the file.

NOTE Valid firmware files must have the file extension “.S19”. Any other file extension is **not** a firmware upgrade.

NOTE The original factory-installed firmware is permanently available on the matrix switcher BME. If the attempted firmware upload fails for any reason, the BME reverts to the factory-installed firmware.

- Click the **Open** button.
- Click the **Upload** button. The firmware upload to the matrix switcher BME may take a few minutes.
- Shift the Ethernet cable to the next BME and repeat steps 4 through 10 for each BME.

HTML Operation, cont'd

File Management Tab

File Management Page

To delete files such as user-supplied HTML pages from the switcher BME or to upload your own files to the switcher, click the **File Management** tab. The switcher BME downloads the file management HTML page (figure 6-10).

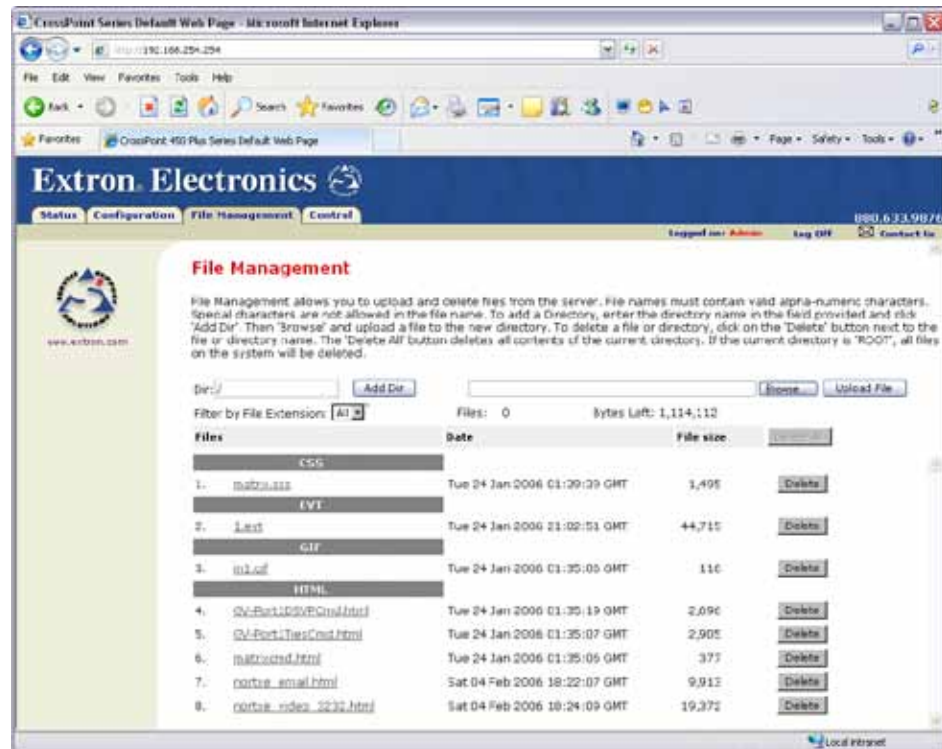


Figure 6-10 — File Management page

NOTE The files listed in figure 6-10 are shown for example only and may not be present on your switcher.

To delete a file, click the **Delete** button adjacent to the unwanted file.

Upload your own files as follows:

NOTE The following characters are invalid in file names:
{space} + ~ , @ = ' [] { } < > ' " ; : | \ and ?.

1. Click the **Browse** button.
2. Browse through your PC system and select the desired file(s).

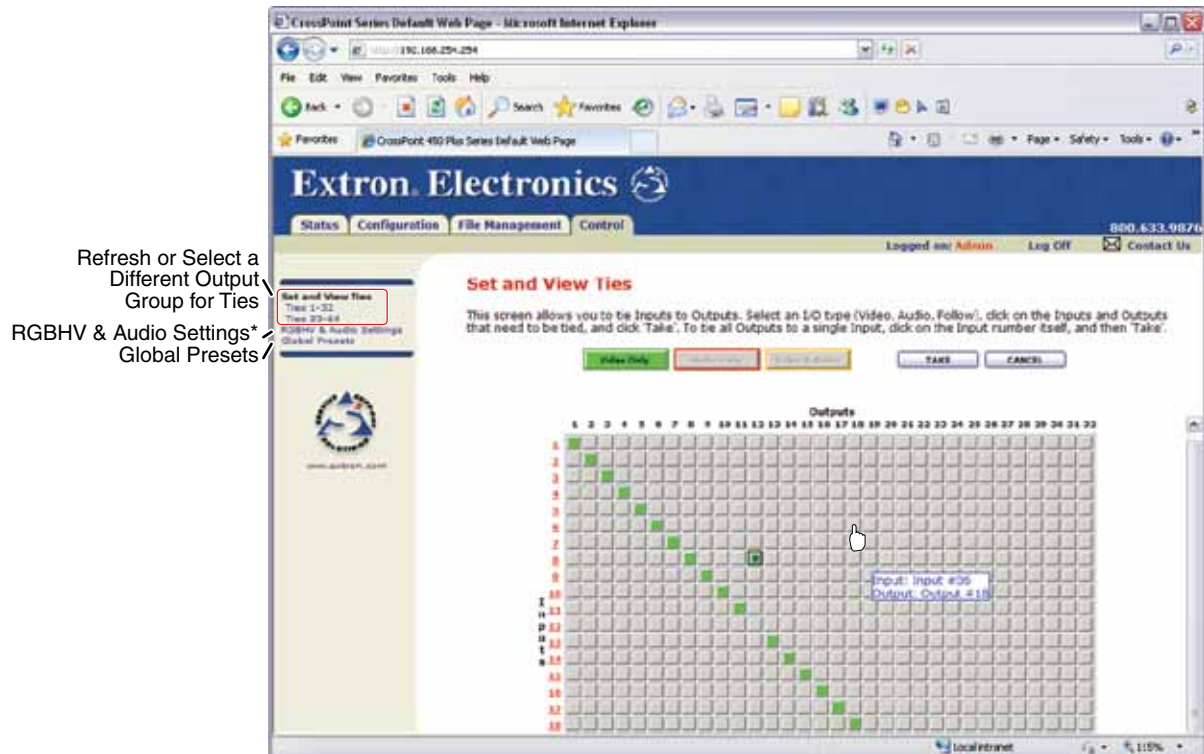
NOTE If you want one of the pages that you create and upload to be the default startup page, name that file "index.html".

3. Click the **Upload File** button. The file(s) that you selected appear in the list.

Control Tab

Set and View Ties page

You can create ties on the Set and View Ties page (figure 6-11). Access the Set and view Ties page by clicking the **Control** tab.



* If no audio BME is installed in your system, this link reads "RGBHV Settings" or "Video Settings".

Figure 6-11 — User Control Ties page

The page consists of a matrix of input (rows) and output (columns) selection buttons of four different colors:

- The **amber** buttons indicate **video and audio ties**.
- The **green** buttons indicate **video only ties**.
- The **red** buttons indicate **audio only ties**.
- The **gray** buttons indicate **no ties**.

NOTE If you lose track of the input and output associated with a specific button, stop the mouse pointer over a button. As shown on figure 6-11, a field pops up that identifies the input and output numbers for that button.

HTML Operation, cont'd

Creating or deleting a tie

Make or break a tie as follows:

1. Click the **Video Only**, **Audio Only**, or **Video & Audio** button to select video, audio, or both for switching (audio breakaway or audio follow). Each mouse click on a button toggles the other two buttons off.
2. Move the mouse over the matrix of input and output selection buttons. Click a button to:
 - Create a pending tie (if a tie does not exist) of the input and output associated with that button.
 - Create a pending untie (if a tie exists) of the input and output associated with that button.

A “P” (for pending) appears in the button.

NOTE *If you lose track of the input and output associated with a specific button, stop the mouse pointer over a button. A field pops up (as shown on figure 6-11) that identifies the input and output for that button.*

NOTE *To tie an input to all outputs, click that input's input number.*

3. Click the **Take** button to make the configuration changes or the **Cancel** button to abandon the configuration changes.

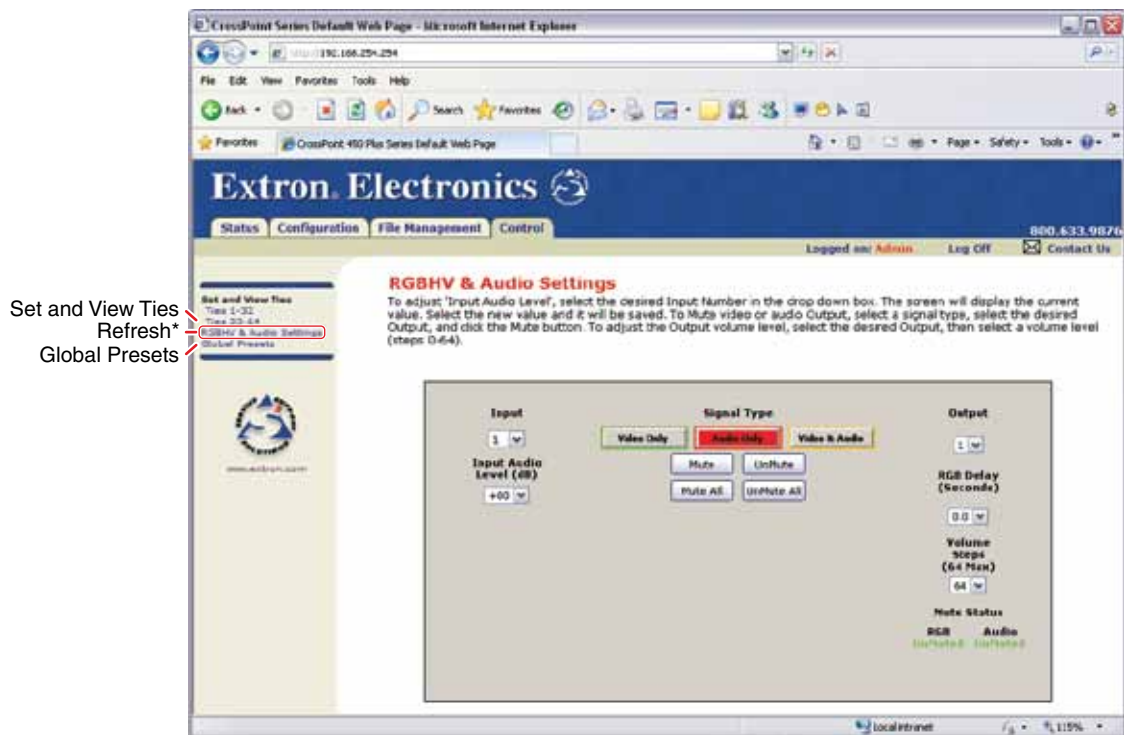
RGBHV and Audio Settings page

NOTE The control options on this page vary, depending on the configuration of the matrix switcher system.

The RGB and Audio Settings page provides the means to:

- **Systems with MAV Plus audio BMEs only** — Set the system's audio parameters (input audio gain and attenuation and output volume).
- **Systems with CrossPoint 450 Plus sync BMEs only** — Set the RGB delay (switching interval).
- Mute and unmute all video and audio outputs as applicable to the system.

Access the RGB and Audio Settings page (figure 6-12) by clicking the **RGB & Audio Settings** link on the Set and View Ties page.



* If no audio BME is installed in your system, this link and the banner on top of the page read "RGBHV Settings" or "Video Settings".

Figure 6-12 — RGB and Audio Settings page

HTML Operation, cont'd

Change the input gain and attenuation (systems with audio BMEs)

Users can set each input's level of audio gain or attenuation (-18 dB to +24 dB) from the RGB and Audio Settings page. Audio levels can be adjusted so there are no noticeable volume differences between sources.

Change an input's audio level setting as follows:

1. Click the Input drop box. A drop-down scroll box appears (figure 6-13).

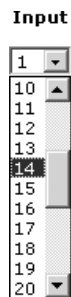




Figure 6-13 — Input selection drop box

2. Click and drag the slider or click on the scroll up  button or scroll down  button until the desired input is visible.
3. Click the desired input.
4. Click the Input Audio Level (dB) drop box. A drop-down scroll box appears (figure 6-14).

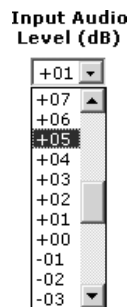




Figure 6-14 — Gain drop box

5. Click and drag the slider or click on the scroll up  button or scroll down  button until the desired input is visible.
6. Click the desired gain or attenuation value.

Mute and unmute one or all outputs

Mute one or all outputs as follows:

1. To select an individual output to mute or unmute, click the Output drop box. A drop-down scroll box appears (figure 6-15).

Output

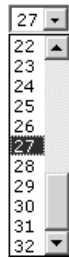




Figure 6-15 — Output selection drop box

2. Click and drag the slider or click the scroll up  button or scroll down  button until the desired output is visible.
3. Click the desired output.
4. Click the **Video Only**, **Audio Only**, or **Video & Audio** button to select video, audio, or both for muting. Each mouse click on a button toggles the other two buttons off.
5. Click the **Mute** or **UnMute** button to mute or unmute the selected output.

Click the **Mute All** or **UnMute All** to mute or unmute all of the outputs.

Observe the Mute status indications on the page (figure 6-16). Unmuted is displayed in green and muted is displayed in red.

Mute Status

RGB	Audio
UnMuted	Muted

Figure 6-16 — Mute status indications

HTML Operation, cont'd

Change the RGB delay (systems with CrossPoint 450 Plus sync BMEs)

The RGB delay interval defines how long the screen is blanked when switching to a new input for the selected output. This value can be set from 00 to 5 seconds in 0.5-second increments.

Change the RGB delay as follows:

1. Click the Output drop box. A drop-down scroll box appears (figure 6-17).

Output

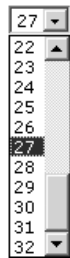




Figure 6-17 — Output selection drop box

2. Click and drag the slider or click on the scroll up  button or scroll down  button until the desired output is visible.
3. Click the desired output.
4. Click the RGB delay drop box. A drop-down scroll box appears (figure 6-18).

**RGB Delay
(Seconds)**

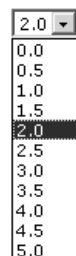


Figure 6-18 — RGB delay drop box

5. Click the desired RGB delay.

Change the output volume level (audio models)

Users can set each output's volume level through a range of zero steps of attenuation (full attenuation, minimum volume) to 64 steps of attenuation (no attenuation, full volume) from the RGB and Audio Settings page.



Change an output's audio level setting as follows:

1. Click the output drop box. A drop-down scroll box appears (figure 6-19).

Output



Figure 6-19 — Output selection drop box

2. Click and drag the slider or click the scroll up  button or scroll down  button until the desired output is visible.
3. Click the desired output.
4. Click the Volume Steps (64 Max) drop box. A drop-down scroll box appears (figure 6-20).

**Volume
Steps
(64 Max)**

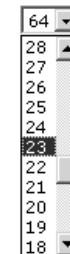


Figure 6-20 — Volume Steps drop box

5. Click the desired output volume step value.

NOTE The table on the next page defines the value of each audio volume step.

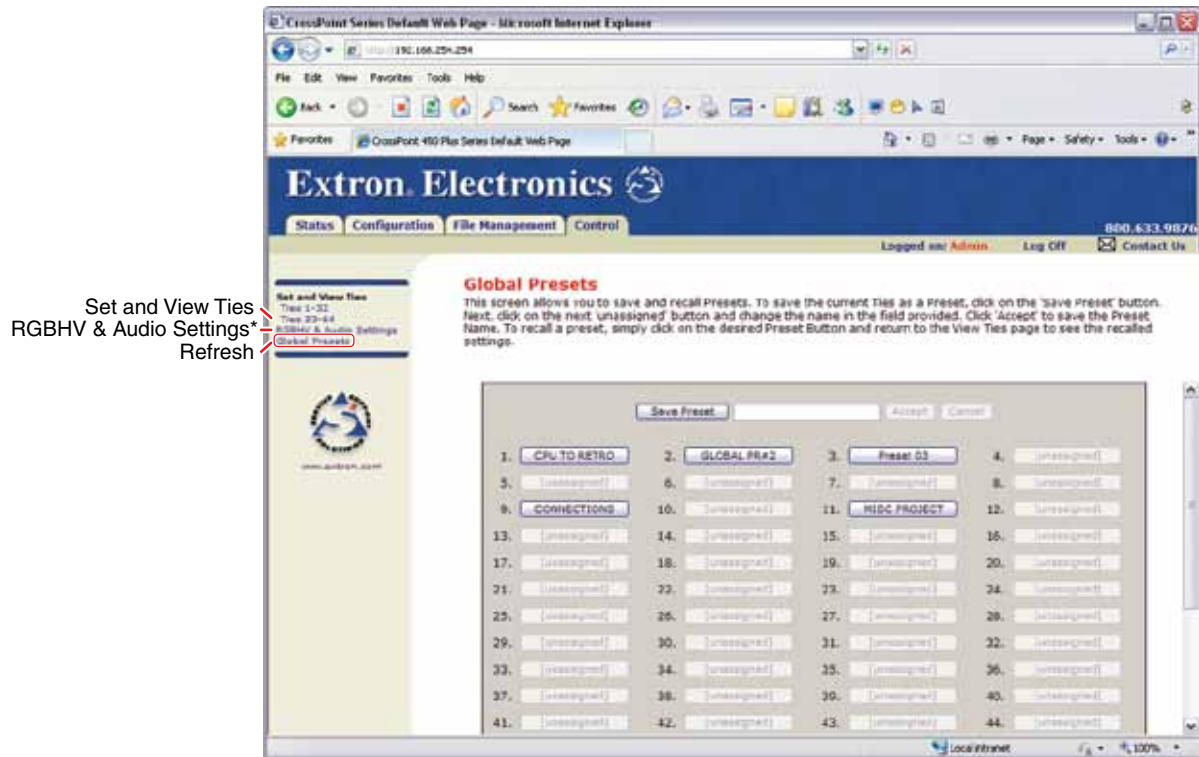
HTML Operation, cont'd

Audio volume adjustment settings

Number of steps	dB of attenuation	Output volume	Number of steps	dB of attenuation	Output volume	Number of steps	dB of attenuation	Output volume
00	76	0%						
01	63	5.5%	23	41	38.5%	45	19	71.5%
02	62	7%	24	40	40%	46	18	73%
03	61	8.5%	25	39	41.5%	47	17	74.5%
04	60	10%	26	38	43%	48	16	76%
05	59	11.5%	27	37	44.5%	49	15	77.5%
06	58	13%	28	36	46%	50	14	79%
07	57	14.5%	29	35	47.5%	51	13	80.5%
08	56	16%	30	34	49%	52	12	82%
09	55	17.5%	31	33	50.5%	53	11	83.5%
10	54	19%	32	32	52%	54	10	85%
11	53	20.5%	33	31	53.5%	55	9	86.5%
12	52	22%	34	30	55%	56	8	88%
13	51	23.5%	35	29	56.5%	57	7	89.5%
14	50	25%	36	28	58%	58	6	91%
15	49	26.5%	37	27	59.5%	59	5	92.5%
16	48	28%	38	26	61%	60	4	94%
17	47	29.5%	39	25	62.5%	61	3	95.5%
18	46	31%	40	24	64%	62	2	97%
19	45	32.5%	41	23	65.5%	63	1	98.5%
20	44	34%	42	22	67%	64	0	100%
21	43	35.5%	43	21	68.5%			
22	42	37%	44	20	70%			

Global Presets page

You can save and recall global presets from the Global presets page (figure 6-21). Access the Global Presets page by clicking the **Global Presets** link on the left of the Set and View Ties page.



* If no audio BME is installed in your system, this link reads "Video Settings".

Figure 6-21 — Global Presets page

Saving a preset

Save the current configuration (configuration 0) as a preset as follows:

1. Click the **Save Preset** button.
2. Select the desired preset by clicking on one of the presets listed. To create a new preset, click one of the **[unassigned]** buttons. Overwrite an existing preset by clicking an already existing preset.
3. If desired, type over the current name in the box adjacent to the **Save Preset** button.

NOTE Preset names are limited to up to 12 upper- and lower-case alphanumeric characters and the {space} _ and / characters.

NOTE The following characters are invalid in preset names:
+ ~ , @ = ' [] { } < > ' " ; : | \ and ?.

If you do not rename an unassigned button, the CrossPoint or MAV switcher names the preset as Preset {the selected preset number}, "Preset 08" for example.

If you do not rename an existing preset when it is overwritten, the CrossPoint or MAV switcher retains the same name.

4. Click the **Accept** button.

HTML Operation, cont'd

Recalling a preset

To recall a global preset to be the current configuration, click the button associated with the desired preset.

Special Characters

The HTML language reserves certain characters for specific functions. The switcher does not accept these characters as part of preset names, the switcher's name, passwords, or locally created file names.

The switcher rejects the following characters:

{space} + ~ , @ = ' [] { } < > ' " semicolon (;) colon (:) | \ and ?.



CrossPoint 450 Plus and MAV Plus Switchers

Appendix A

Ethernet Connection

Ethernet Link

Subnetting — A Primer

Ethernet Connection

Ethernet Link

The rear panel Ethernet connector on the CrossPoint 450 Plus and MAV Plus switcher BMEs can be connected to an Ethernet LAN or WAN. This connection makes SIS control of the switcher possible using a computer connected to the same LAN. Although for normal system control, the connection is to BME 0, you can connect to and communicate with any BME (for example, you connect to other BMEs to perform a firmware upgrade).



Ethernet connection

The Ethernet cable can be terminated as a straight-through cable or a crossover cable and must be properly terminated for your application (figure A-1).

- **Crossover cable** — Direct connection between the computer and switcher BME (usually BME 0)
- **Patch (straight-through) cable** — Connection of a switcher BME (usually BME 0) to an Ethernet LAN

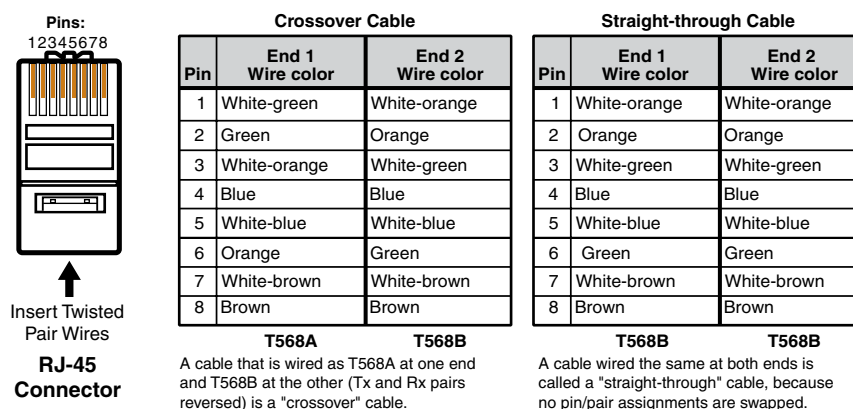


Figure A-1 — RJ-45 connector pinout tables

Default IP address

To access the matrix switcher BME via the LAN port, you need the switcher's IP address. If the address has been changed to an address comprised of words and characters, you can determine the actual numeric IP address using the Ping utility. If the address has not been changed, the factory-specified default is 192.168.254.254.

Ping can also be used to test the LAN port of any CrossPoint 450 Plus or MAV Plus switcher BME.

Pinging to determine the Extron IP address

The Ping utility is available at the DOS prompt. Ping tests the Ethernet interface between the computer and a switcher BME (usually BME 0). Ping can also be used to determine the actual numeric IP address from an alias and to determine the web address.

Ping the switcher as follows:

1. On the Windows task bar, click on **Start > Run**.
2. At the Open prompt, type *command*.
3. Click the **OK** button.

-
- At the DOS prompt, type `ping {IP address}` and then press **Enter**. The computer returns a display similar to as shown below.

The line **Pinging ...** reports the actual numeric IP address, regardless of whether you entered the actual numeric IP address or an alias name.

```
C:\>ping 192.168.254.254

Pinging 192.168.254.254 with 32 bytes of data:

Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128

Ping statistics for 192.168.254.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Pinging to determine the Web IP address

The Ping utility has a modifier, `-a`, that directs the command to return the Web address rather than the numeric IP address.

At the DOS prompt, type `ping -a {IP address}` and then press **Enter**. The computer's return display is similar to the Ping response shown in the figure above, except that when you specify the `-a` modifier, the line **Pinging mail...** reports the web IP address rather than the numeric IP address, regardless of whether you entered the actual numeric IP address or an alias name.

Configuring the matrix switcher BME for network use via the ARP command

The ARP (address resolution protocol) command tells your computer to associate the matrix switcher BME's MAC (media access control) address with the assigned IP address. You must then use the ping utility to access the controller, at which point the controller's IP address is reconfigured.

Use ARP to configure the IP address as follows:

- Obtain a valid IP address for the matrix switcher BME from your network administrator.
- Obtain the BME's MAC address (UID #) from the label on its rear panel. The MAC address should have this format: 00-05-A6-xx-xx-xx.
- If the matrix switcher BME has never been configured and is still set for factory defaults, proceed to step 4. If not, perform a Mode 4 system reset and then proceed to step 4. For detailed information on reset modes, see "Performing soft system resets (reset modes 3, 4, and 5)" in chapter 3, "Operation".

NOTE The matrix switcher BME must be configured with the factory default IP address (192.168.254.254) before the ARP command is executed, as described on the next page.

Ethernet Connection, cont'd

4. At the PC, access the MS-DOS command prompt (see “Pinging to determine the Extron IP address”, steps 1 through 3), then enter the `arp -s` command. Type in the desired new IP address for the unit (obtained in step 1) and the unit's MAC address (from the unit's rear panel), for example
`arp -s 10.13.197.7 00-05-A6-03-69-B0` and then press {Enter}.

The computer returns the command prompt (C:\).

After you issue the `arp -s` command, the controller changes to the new address and starts responding to the ping requests to the new address, as described in the next step.

NOTE You must ping the matrix switcher BME for the IP address change to take place. The response should show the new IP address, as shown below.

5. Execute a ping command by entering “ping” followed by a space and the new IP address at the command prompt. For example:

`ping 10.13.197.7`

```
C:\>ping 10.13.197.7
```

```
Pinging 10.13.197.7 with 32 bytes of data:
```

```
Reply from 10.13.197.7: bytes=32 time<10ms TTL=128
```

```
Reply from 10.13.197.7: bytes=32 time<10ms TTL=128
```

```
Reply from 10.13.197.7: bytes=32 time<10ms TTL=128
```

```
Reply from 10.13.197.7: bytes=32 time<10ms TTL=128
```

```
Ping statistics for 10.13.197.7:
```

```
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
```

```
Approximate round trip times in milli-seconds:
```

```
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

NOTE You can reconnect using either Telnet or a Web browser to verify that the update was successful.

6. After verifying that the IP address change was successful, enter and issue the `arp -d` command at the DOS prompt. For example:

`arp -d 10.13.197.7` removes 10.13.197.7 from the ARP table

or

`arp -d*` removes all static IP addresses from the ARP table.

Connecting as a Telnet client

The Microsoft Telnet utility is available from the command prompt. Telnet allows you to input SIS commands to the BME from the PC via the LAN port and the LAN.

Access the DOS prompt and start Telnet as follows:

1. On the Windows task bar, click on **Start > Run**.
2. At the Open prompt, type *command*.
3. Click the **OK** button.
4. At the DOS prompt, type *telnet* and then press **Enter**. The computer returns a display similar to as shown below.

```
Microsoft (R) windows 2000 (TM) Version 5.0 (Build 2195)
Welcome to Microsoft Telnet Client
Telnet Client Build 5.00.99203.1

Escape Character is 'CTRL+]'

Microsoft Telnet>
```

Telnet tips

It is not the intention of this manual to detail all of the operations and functionality of Telnet; however, some basic level of understanding is necessary for operating the matrix switcher via Telnet.

Open

Connect to the BME using the Open command. Once you are connected to the switcher, you can enter the SIS commands the same as you would if you were using either serial port.

Connect to the BME as follows:

1. At the Telnet prompt, type *open {IP address}* and then press **Enter**.

If the BME is not password protected, no further prompts are displayed until you break or disconnect the connection to the matrix switcher.

If the BME is password protected, Telnet displays the password prompt.

2. If necessary, at the password prompt, type *{password}* and then press **Enter**.

Connection to the BME via the Ethernet can be password protected. There are two levels of password protection: administrator and user. A person logged on as an administrator has full access to all matrix switcher switching capabilities and editing functions. Users can create ties, set mutes, and view all settings with the exception of passwords. By default, all BMEs ship with both passwords set to {carriage return}.

Once you are logged in, the BME returns either **Login Administrator** or **Login User**. No further prompts are displayed until you break or disconnect the connection to the BME matrix switcher.

Ethernet Connection, cont'd

Escape character and Esc key

When Telnet is first started, the utility advises that the **Escape character** is 'Ctrl+I'. Many SIS commands include the keyboard **Esc** key. Consequently, some confusion may exist between the Escape character and the Escape key.

The Telnet Escape character is a key combination, the **Ctrl** key and the **I** key pressed simultaneously, that returns you to the Telnet prompt while leaving the connection to the BME intact.

The Escape key is the **Esc** key on the computer keyboard.

Local echo

Once connected to the BME, by default, Telnet does not display your keystrokes on the screen. SIS commands are typed in blindly and only the SIS responses are displayed on the screen. To command Telnet to show keystrokes, at the Telnet prompt, type `set local_echo` and then press **Enter** before you open the connection to the switcher.

With local echo turned on, keystrokes and the switcher's responses are displayed on the same line. For example: **1*1!In1 Out1 All**, where **1*1!** is the SIS command and **In1 Out1 All** is the response.

With local echo turned on, all keystrokes are displayed, even those that should be masked, such as the password entry. For example, when entering a password with local echo turned on, you see a display such as **a*d*m*i*n***, where **admin** is the key in password and ********* is the masked response.

You can turn off local echo by typing `unset local_echo` and then pressing **Enter** at the Telnet prompt. If your computer is connected to the BME and you need to access the Telnet prompt to turn local echo off, type the Escape character (**Ctrl+I**).

Set carriage return - line feed

Unless commanded otherwise, Telnet transmits a line feed character only (no carriage return) to the connected BME when you press the **Enter** key. This is the correct setting for SIS communication with the switcher. The Telnet `set crlf` command forces Telnet to transmit carriage return and line feed characters when **Enter** is pressed, but if `crlf` is set, the SIS link with the BME does not function properly.

Close

To close the link to the BME, access the Telnet prompt by typing the Escape character (**Ctrl+I**). At the Telnet prompt, type `close`, and then press **Enter**.

Help

For Telnet command definitions, at the Telnet prompt, type `?` and then press **Enter**.

Quit

Exit the Telnet utility by typing `quit` and then pressing **Enter** at the Telnet prompt. If you are connected to the BME, access the Telnet prompt by typing the Escape character (**Ctrl+I**).

Subnetting — A Primer

It is not the purpose of this manual to describe TCP/IP protocol in detail. However, some understanding of TCP/IP subnetting (a subnet is a **subset** of a **network** — a set of IP devices that have portions of their IP addresses in common) is necessary in order to understand the interaction of the BME and the mail server gateway. To understand subnetting at the level required to install and operate the switcher, you must understand the concepts of a gateway, local and remote devices, IP addresses and octets, and subnet masks and octets.

Gateways

BME 0 can communicate with the e-mail server that the switcher uses for e-mail notification directly (if they are on the same subnet) or the communication can be routed via a gateway (a computer that provides a link between different subnets).

Local and remote devices

The local and remote devices are defined from the point of view of the function being described. In this manual, subnetting is an issue when you are using the controlling PC to set TCP/IP and e-mail values in BME 0 (see “IP Settings/Options window” in chapter 5, “Matrix Software”, and “Email Settings page” in chapter 6, “HTML Operation”). When you are setting up the variables for e-mail notification, which may include subnetting, the matrix switcher is the local device and the e-mail server is the remote device.

IP addresses and octets

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric subfields, properly called octets, separated by dots (periods) as shown below. Each octet can be numbered from 000 through 255. Leading zeroes, up to three digits total per octet, are optional. Values of 256 and above are invalid.

Typical IP Address: 192.168.254.254
Octets

Subnet masks and octets

The subnet mask (shown below) is used to determine whether the local and remote devices are on the same subnet or different subnets. The subnet mask consists of four numeric octets separated by dots. Each octet can be numbered from 000 through 255. Leading zeroes, up to three digits total per octet, are optional. Each octet typically contains either 255 or 0. The octets determine whether or not the same octets of two IP addresses will be compared when determining if two devices are on the same subnet.

255 indicates that this octet will be compared between two IP addresses. 0 indicates that this octet will **not** be compared between two IP addresses.

Typical Subnet Mask: 25525500

Octets

Ethernet Connection, cont'd

Determining whether devices are on the same subnet

To determine the subnet, the local device's IP address is **compared** to the remote device's IP address (below). Each address's octets are **compared** or **not compared**, depending on the value in the related subnet mask octet.

- If a subnet mask octet contains the value 255, the related octets of the local device's address and the remote device's IP address are unmasked.

Unmasked octets are compared (indicated by ? in the figure below).

- If the subnet mask octet contains the value 0, the related octets of the local device's and remote device's IP addresses are masked.

Masked octets are not compared (indicated by X in the figure below).

If the unmasked octets of the two IP addresses **match** (indicated by = in the figure below), the two addresses **are on the same subnet** (example 1).

If the two unmasked fields **do not match** (indicated by ≠ in the figure below), the addresses **are not on the same subnet** (example 2 and example 3).

	Example 1	Example 2	Example 3
Local IP Address:	192.168.254.254	192.168.254.254	192.168.254.254
Subnet Mask:	255.255.0.0 (? . ? . X . X)	255.255.0.0 (? . ? . X . X)	255.255.0.0 (? . ? . X . X)
Remote IP Address:	192.168.2.25	190.190.2.25	192.190.2.25
Match?:	= . = . X . X — Match (Same subnet)	≠ . ≠ . X . X — No match (Different subnet)	= . ≠ . X . X — No match (Different subnet)



CrossPoint 450 Plus and MAV Plus Switchers

Appendix B

Reference Information

CrossPoint 450 Plus Specifications

MAV Plus Specifications

Part Numbers and Accessories

Removing and Installing Button Labels

Reference Information

CrossPoint 450 Plus Specifications

Video

Routing	64 x 64, 64 x 48, 64 x 32, 48 x 64, 48 x 48, 48 x 32, 32 x 48, or 32 x 64 matrix
Gain	Unity
Bandwidth.....	450 MHz (-3 dB), fully loaded
0 - 10 MHz	No more than +0.1 dB to -0.1 dB
0 - 130 MHz	No more than +1.0 dB to -1.0 dB
Crosstalk.....	-80 dB @ 1 MHz, -62 dB @ 10 MHz, -52 dB @ 30 MHz
Switching speed	200 ns (max.)

Video input

Number/signal type.....	32, 48, or 64 RGBHV, RGBS, RGsB, RsGsBs, HDTV, component video
Connectors	32, 48, or 64 female BNC
Nominal level	1 Vp-p for Y of component video and S-video, and for composite video 0.7 Vp-p for RGB and for R-Y and B-Y of component video 0.3 Vp-p for C of S-video
Minimum/maximum levels.....	Analog: 0.5 V to 2.0 Vp-p with no offset
Impedance	75 ohms
Return loss	<-30 dB @ 5 MHz
DC offset (max. allowable).....	1.5 V

Video output

Number/signal type.....	32, 48, or 64 RGBHV, RGBS, RGsB, RsGsBs, HDTV, component video
Connectors	32, 48, or 64 female BNC
Nominal level	1 Vp-p for Y of component video and S-video, and for composite video 0.7 Vp-p for RGB and for R-Y and B-Y of component video 0.3 Vp-p for C of S-video
Minimum/maximum levels.....	0 V to 2.0 Vp-p (follows input)
Impedance	75 ohms
Return loss	-30 dB @ 5 MHz
DC offset	±5 mV with input at 0 offset
Switching type	Triple-Action™

Sync

Input type	RGBHV, RGBS, RGsB, RsGsBs
Output type.....	RGBHV, RGBS, RGsB, RsGsBs (follows input)
Input level	0.5 V to 5.0 Vp-p, 4.0 Vp-p normal
Output level	AGC to TTL: 4.0 V to 5.0 Vp-p, unterminated
Input impedance	Inputs 1 to 16: 75 or 510 ohms, switchable Inputs 17 to 32, 48, or 64: 510 ohms
Output impedance	75 ohms
Horizontal frequency.....	15 kHz to 150 kHz
Vertical frequency.....	30 Hz to 150 Hz
Max. propagation delay	30 ns
Max. rise/fall time	4 ns
Polarity.....	Positive or negative (follows input)

Audio — See "MAV Plus Specifications" (page B-4)

Audio input — See "MAV Plus Specifications" (page B-&)

Audio output — See "MAV Plus Specifications" (page B-&)

Control/remote — switcher

Serial control port.....	1 RS-232 or RS-422 female 9-pin D connector (rear panel) 1 RS-232 2.5 mm phone jack (front panel)
Baud rate and protocol	
9-pin D connector.....	9600 (default), 19200, 38400, 115200 baud (adjustable); 8 data bits, 1 stop bit, no parity
2.5 mm phone jack	9600 baud; 8 data bits, 1 stop bit, no parity
Serial control pin configurations	
9-pin D connector.....	RS-232: 2 = Tx, 3 = Rx, 5 = GND RS-422: 2 = Tx-, 3 = Rx-, 5 = GND, 7 = Rx+, 8 = Tx+
2.5 mm phone jack	Tip = Tx, ring = Rx, sleeve = GND
Ethernet control port.....	1 female RJ-45 connector
Ethernet data rate	10/100Base-T, half/full duplex with autodetect
Ethernet protocol.....	ARP, ICMP (ping), TCP/IP, DHCP, HTTP, Telnet
Program control.....	Extron control/configuration program for Windows® Extron Simple Instruction Set (SIS™) Microsoft® Internet Explorer, Telnet

General

Power	100 VAC to 240 VAC, 50-60 Hz, internal, primary and redundant (64 or 48) x (32, 48, or 64) wideband: 110 watts at 115 VAC, 60 Hz 32 x (48 or 64) wideband: 50 watts at 115 VAC, 60 Hz (64 x 64) sync: 65 watts at 115 VAC, 60 Hz
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NOTE *A redundant power supply is standard.*

Temperature/humidity	Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, noncondensing Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, noncondensing
Cooling	Convection, vents on right and left sides
Mounting.....	Rack mountable with included parts
Enclosure type	Metal
Enclosure dimensions.....	10.5" H x 17.0" W x 14.1" D (6U high, full rack wide) 26.7 cm H x 43.2 cm W x 35.8 cm D
Product weight per BME	
32 x 48 through 64 x 64 Series wideband video BMEs	18.0 lbs (8.2 kg)
32 x 48 through 64 x 64 Series sync BMEs	17.0 lbs (7.7 kg)
Shipping weight per BME	
32 x 48 through 64 x 64 Series wideband video BMEs	30 lbs (14 kg)
32 x 48 through 64 x 64 Series sync BMEs	29 lbs (13 kg)
DIM weight, international, per BME	44 lbs (20 kg)

NOTE *An RGBHV system is shipped as 5 BMEs in 5 cartons.*

Vibration	ISTA 1A in carton (International Safe Transit Association)
Regulatory compliances	
Safety.....	CE, c-UL, UL
EMI/EMC	CE, C-tick, FCC Class A, ICES, VCCI
MTBF.....	30,000 hours
Warranty	3 years parts and labor

NOTE *All nominal levels are at ±10%.*

NOTE *Specifications are subject to change without notice.*

Reference Information, cont'd

MAV Plus Specifications

Video — video BMEs

Routing	64 x 64, 64 x 48, 64 x 32, 48 x 64, 48 x 48, 48 x 32, 32 x 48, or 32 x 64 matrix
Gain	Unity
Bandwidth.....	150 MHz (-3 dB), fully loaded
0 - 10 MHz	No more than +0.1 dB to -0.1 dB
0 - 130 MHz	No more than +0.1 dB to -0.1 dB
Crosstalk.....	-80 dB @ 1 MHz, -62 dB @ 10 MHz, -52 dB @ 30 MHz
Switching speed	200 ns (max.)

Video input — video BMEs

Number/signal type.....	32, 48, or 64 composite video
Connectors	32, 48, or 64 female BNC
Nominal level	1 Vp-p for composite video
Minimum/maximum levels.....	Analog: 0.5 V to 2.0 Vp-p with no offset
Impedance.....	75 ohms
Horizontal frequency.....	15 kHz to 150 kHz
Vertical frequency.....	30 Hz to 150 Hz
Return loss.....	<-30 dB @ 5 MHz
DC offset (max. allowable).....	1.5 V

Video output — video BMEs

Number/signal type.....	32, 48, or 64 composite video
Connectors	32, 48, or 64 female BNC
Nominal level	1 Vp-p for composite video
Minimum/maximum levels.....	0 V to 2.0 Vp-p (follows input)
Impedance.....	75 ohms
Return loss.....	<-30 dB @ 5 MHz
DC offset.....	±5 mV with input at 0 offset
Switching type.....	Vertical interval

Sync — video BMEs

Genlock connectors.....	1 female BNC
Standards.....	NTSC 3.58, NTSC 4.43, PAL, SECAM

Audio — audio BMEs

Routing	(32, 48, or 64) x (32, 48, or 64) stereo or mono matrix
---------------	---

NOTE Both stereo (2 channel) and mono (1 channel) audio models are available.

Gain	Unbalanced output: -6 dB; balanced output 0 dB
Frequency response	20 Hz to 20 kHz, ±0.05 dB
THD + Noise.....	0.03% @ 1 kHz at nominal level
S/N.....	>90 dB, balanced, at maximum output (21 dBu), unweighted
Crosstalk.....	<-80 dB @ 1 kHz, fully loaded
Stereo channel separation	>80 dB @ 1 kHz
CMRR.....	>75 dB @ 20 Hz to 20 kHz

Audio input — audio BMEs

Number/signal type.....	32, 48, or 64 stereo balanced/unbalanced <i>or</i> 32, 48, or 64 mono balanced/unbalanced
Connectors	
Stereo models.....	(32, 48, or 64) 3.5 mm captive screw connectors, 5 pole
Mono models	(32, 48, or 64) 3.5 mm captive screw connectors, 3 pole
Impedance	>10k ohm, balanced/unbalanced, DC coupled
Nominal level	-10 dBV (316 mVrms)
Maximum level.....	+19.5 dBu, (balanced or unbalanced) at 1% THD+N
Input gain adjustment	-18 dB to +24 dB, adjustable per input by RS-232/422, Ethernet, or front panel

NOTE $0\text{ dBu} = 0.775\text{ Vrms}$, $0\text{ dBV} = 1\text{ Vrms}$, $0\text{ dBV} \approx 2\text{ dBu}$

Audio output — audio BMEs

Number/signal type.....	32, 48, or 64 stereo balanced/unbalanced <i>or</i> 32, 48, or 64 mono balanced/unbalanced
Connectors	
Stereo models.....	(32, 48, or 64) 3.5 mm captive screw connectors, 5 pole
Mono models	(32, 48, or 64) 3.5 mm captive screw connectors, 3 pole
Impedance	50 ohms unbalanced, 100 ohms balanced
Gain error	± 0.1 dB channel to channel
Maximum level (Hi-Z)	>+21 dBu, balanced or unbalanced at 0.1% THD+N
Maximum level (600 ohm).....	>+15 dBm, balanced or unbalanced at 0.1% THD+N
Output volume range	0 to 64 (-98 dB to 0 dB) in 0.5 dB increments from steps 1 to 64, 35 dB increment from step 0 to 1

Control/remote — switcher

Serial control port.....	1 RS-232 or RS-422, female 9-pin D connector (rear panel) 1 RS-232 2.5 mm phone jack (front panel)
Baud rate and protocol.....	9600 (default), 19200, 38400, 115200 baud (adjustable); 8 data bits, 1 stop bit, no parity
Serial control pin configurations.	RS-232: 2 = Tx, 3 = Rx, 5 = GND RS-422: 2 = Tx-, 3 = Rx-, 5 = GND, 7 = Rx+, 8 = Tx+
Ethernet control port.....	1 female RJ-45 connector
Ethernet data rate.....	10/100Base-T, half/full duplex with autodetect
Ethernet protocol.....	ARP, ICMP (ping), TCP/IP, DHCP, HTTP, Telnet
Program control.....	Extron control/configuration program for Windows® Extron Simple Instruction Set (SIS™) Microsoft® Internet Explorer, Telnet

General

Power	100 VAC to 240 VAC, 50-60 Hz, internal, primary and redundant
Video models	110 watts at 115 VAC, 60 Hz
All audio models	195 watts at 115 VAC, 60 Hz

NOTE *A redundant power supply is standard.*

Temperature/humidity	Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, noncondensing Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, noncondensing
Cooling	
Video models	Fan, right to left (viewed from the front panel)
Audio models	Convection, vents on right and left sides
Mounting.....	Rack mountable with included parts

Reference Information, cont'd

Enclosure type Metal

Enclosure dimensions

Video BMEs..... 10.5" H x 17.0" W x 14.1" D (6U high, full rack wide)
(26.7 cm H x 43.2 cm W x 35.8 cm D)

Audio BMEs..... 12.25" H x 17.0" W x 14.1" D (7U high, full rack wide)
(31.1 cm H x 43.2 cm W x 35.8 cm D)

Product weight per BME

32 x 48 through 64 x 64 Series video BMEs
18.0 lbs (8.2 kg)

32 x 48 through 64 x 64 Series stereo audio BMEs
19.0 lbs (8.6 kg)

32 x 48 through 64 x 64 Series mono audio BMEs
18.5 lbs (8.4 kg)

Shipping weight per BME

32 x 48 through 64 x 64 Series video BMEs
29 lbs (13 kg)

32 x 48 through 64 x 64 Series stereo audio BMEs
31 lbs (14 kg)

32 x 48 through 64 x 64 Series mono audio BMEs
30 lbs (14 kg)

DIM weight, international, per BME

44 lbs (20 kg)

Vibration..... ISTA 1A in carton (International Safe Transit Association)

Regulatory compliance

Safety..... CE, c-UL, UL

EMI/EMC CE, C-tick, FCC Class A, ICES, VCCI

MTBF..... 30,000 hours

Warranty..... 3 years parts and labor

NOTE *All nominal levels are at $\pm 10\%$.*

NOTE *Specifications are subject to change without notice.*

Part Numbers and Accessories

CrossPoint 450 Plus system part numbers

NOTE *The part numbers below are for complete RGBHV (five BMEs) systems with or without stereo audio (a sixth, stereo audio, BME) only.*

A front panel controller is incorporated into one of the BMEs in the system.

For custom systems, such as RGBS video, mono audio, or no front panel controller, see "BME part numbers" to order individual BMEs.

Model	Part number
CrossPoint 450 Plus 3248 HV video switcher	42-078-40
CrossPoint 450 Plus 3248 HVA video and audio switcher	42-078-45
CrossPoint 450 Plus 3264 HV video switcher	42-079-40
CrossPoint 450 Plus 3264 HVA video and audio switcher	42-079-45
CrossPoint 450 Plus 4832 HV video switcher	42-080-40
CrossPoint 450 Plus 4832 HVA video and audio switcher	42-080-45
CrossPoint 450 Plus 4848 HV video switcher	42-081-40
CrossPoint 450 Plus 4848 HVA video and audio switcher	42-081-45
CrossPoint 450 Plus 4864 HV video switcher	42-082-40
CrossPoint 450 Plus 4864 HVA video and audio switcher	42-082-45
CrossPoint 450 Plus 6432 HV video switcher	42-083-40
CrossPoint 450 Plus 6432 HVA video and audio switcher	42-083-45
CrossPoint 450 Plus 6448 HV video switcher	42-084-40
CrossPoint 450 Plus 6448 HVA video and audio switcher	42-084-45
CrossPoint 450 Plus 6464 HV video switcher	42-085-40
CrossPoint 450 Plus 6464 HVA video and audio switcher	42-085-45

Reference Information, cont'd

MAV Plus system part numbers

NOTE *The part numbers below are for composite video (one BME) switchers with or without stereo audio (a second, stereo audio, BME) only.*

A front panel controller is incorporated into the video BME.

For S-video and component video systems, systems with mono audio, or audio only switchers, see "BME part numbers" to order individual BMEs.

Model	Part number
MAV Plus 3248 V video switcher	60-761-31
MAV Plus 3248 AV video and audio switcher	42-078-15
MAV Plus 3264 V video switcher	60-762-31
MAV Plus 3264 AV video and audio switcher	42-079-15
MAV Plus 4832 V video switcher	60-763-31
MAV Plus 4832 AV video and audio switcher	42-080-15
MAV Plus 4848 V video switcher	60-764-31
MAV Plus 4848 AV video and audio switcher	42-081-15
MAV Plus 4864 V video switcher	60-765-31
MAV Plus 4864 AV video and audio switcher	42-082-15
MAV Plus 6432 V video switcher	60-766-31
MAV Plus 6432 AV video and audio switcher	42-083-15
MAV Plus 6448 V video switcher	60-767-31
MAV Plus 6448 AV video and audio switcher	42-084-15
MAV Plus 6464 V video switcher	60-768-31
MAV Plus 6464 AV video and audio switcher	42-085-15

BME part numbers

NOTE The complete system part numbers listed on the preceding pages are for either:

- RGBHV systems (three wideband video and two sync BMEs)
- Composite video switchers (one video BME)

Any of the above matrix switchers is available as a complete system with or without stereo audio (an extra, stereo audio, BME).

For custom systems, such as RGBS video, S-video, component video, or systems with mono audio, see the part numbers on the following pages and order the required BMEs for your system.

- One CrossPoint 450 Plus wideband video BME for each high resolution video plane (typically three required)
- One CrossPoint 450 Plus sync BME for each sync plane
- One MAV Plus video BME for each low resolution video plane:
 - Three BMEs for component video
 - Two BMEs for S-video
 - One BME for composite video
- If desired, one MAV Plus audio (stereo or mono) BME

Order all BMEs of the same matrix size, such as 6464.

If desired, order one wideband video BME with an optional QuickSwitch-Front Panel Controller (QS-FPC™).

- A system should include only one operational QS-FPC.
- The QS-FPC is standard, not optional, on MAV Plus video BMEs. In systems with multiple BMEs, only one QS-FPC is operational.
 - Multiple QS-FPCs are potentially confusing. An S-video or component video system has multiple QS-FPCs by default. To avoid confusion, Extron recommends that you lock the redundant QS-FPCs. See "Setting the front panel locks (Executive modes)" on page 3-43.
- A front panel controller cannot be installed on a sync or audio BME.
- Connect the BMEs as detailed in chapter 2, "Installation".

Reference Information, cont'd

CrossPoint 450 Plus wideband video BMEs

BME	Part number
CrossPoint 450 Plus 3248 WB	60-761-40
CrossPoint 450 Plus 3248 WB FPC	60-761-41
CrossPoint 450 Plus 3264 WB	60-762-40
CrossPoint 450 Plus 3264 WB FPC	60-762-41
CrossPoint 450 Plus 4832 WB	60-763-40
CrossPoint 450 Plus 4832 WB FPC	60-763-41
CrossPoint 450 Plus 4848 WB	60-764-40
CrossPoint 450 Plus 4848 WB FPC	60-764-41
CrossPoint 450 Plus 4864 WB	60-765-40
CrossPoint 450 Plus 4864 WB FPC	60-765-41
CrossPoint 450 Plus 6432 WB	60-766-40
CrossPoint 450 Plus 6432 WB FPC	60-766-41
CrossPoint 450 Plus 6448 WB	60-767-40
CrossPoint 450 Plus 6448 WB FPC	60-767-41
CrossPoint 450 Plus 6464 WB	60-768-40
CrossPoint 450 Plus 6464 WB FPC	60-768-41

CrossPoint 450 Plus sync BMEs

NOTE Only one sync BME matrix size is available for separate purchase. Use the 6464 matrix size sync BME for all custom matrix switcher configurations of all matrix sizes 3248 and larger.

BME	Part number
CrossPoint 450 Plus 6464 sync	60-768-20

MAV Plus video BMEs

BME	Part number
MAV Plus 3248 video FPC	60-761-31
MAV Plus 3264 video FPC	60-762-31
MAV Plus 4832 video FPC	60-763-31
MAV Plus 4848 video FPC	60-764-31
MAV Plus 4864 video FPC	60-765-31
MAV Plus 6432 video FPC	60-766-31
MAV Plus 6448 video FPC	60-767-31
MAV Plus 6464 video FPC	60-768-31

MAV Plus stereo audio BMEs

BME	Part number
MAV Plus 3248 stereo audio	60-761-15
MAV Plus 3264 stereo audio	60-762-15
MAV Plus 4832 stereo audio	60-763-15
MAV Plus 4848 stereo audio	60-764-15
MAV Plus 4864 stereo audio	60-765-15
MAV Plus 6432 stereo audio	60-766-15
MAV Plus 6448 stereo audio	60-767-15
MAV Plus 6464 stereo audio	60-768-15

MAV Plus mono audio BMEs

BME	Part number
MAV Plus 3248 mono audio	60-761-10
MAV Plus 3264 mono audio	60-762-10
MAV Plus 4832 mono audio	60-763-10
MAV Plus 4848 mono audio	60-764-10
MAV Plus 4864 mono audio	60-765-10
MAV Plus 6432 mono audio	60-766-10
MAV Plus 6448 mono audio	60-767-10
MAV Plus 6464 mono audio	60-768-10

Included parts

Part	Part number
5-pole captive screw audio connectors (with stereo audio BMEs only)	
3-pole captive screw audio connectors (with mono audio BMEs only)	
Extron Software Products disk (Matrix Switchers Control Program and Button Label Generator)	
<i>CrossPoint 450 Plus/MAV Matrix Plus Switcher Setup Guide</i>	
BNC extraction tool (with video and sync BMEs)	100-096-01

Replacement parts

Included parts	Part number
Button and cap diffuser kit	70-352-01
Button overlays	
5-pole captive screw audio connectors (qty. 10)	100-460-01

Reference Information, cont'd

Optional accessories

These items can be ordered separately:

Accessory	Part number
MKP 1000 remote keypad	
Black	60-239-02
White	60-239-03
WT (water-tight), black	60-239-52
WT (water-tight), white	60-239-53
MCP 1000M (master)	60-298-01
MKP 2000 X-Y remote control panel	
Black	60-682-02
White	60-682-03
MKP 3000	
Black	60-708-02
White	60-708-03
MKP 3000 L (lecturn mounted)	60-709-22
Button cap and diffuser kit (set of 3 button cap assemblies)	70-352-01

Cables

When using signals with a scanning frequency of 15-125 kHz and running distances of 100 feet or more, use high resolution BNC cables to achieve maximum performance.

Bulk cable

RG6 super high resolution cable	Part number
RG6-5/500, non-plenum 5-conductor 500'/150 m spool	22-100-02
RG6-1/1000, non-plenum 1-conductor 1000'/300 m spool	22-098-03
RG6-1/500, non-plenum 1-conductor 500'/150 m spool	22-098-02
RG6P/1000, plenum 1-conductor 1000'/300 m spool	22-164-03
RG6P/500, plenum 1-conductor 500'/150 m spool	22-164-02
BNC male SHR crimp connectors, qty. 500	100-260-02
BNC male SHR crimp connectors, qty. 50	100-260-01

RG59 high resolution cable	Part number
RG59/1000 non-plenum 1-conductor 1000'/300 m spool	22-145-03
RG59/500 non-plenum 1-conductor 500'/150 m spool	22-145-02
RG59P/1000 plenum 1-conductor 1000'/300 m spool	22-146-03
RG59P/500 plenum 1-conductor 500'/150 m spool	22-146-02
BNC male RG59/HR crimp connectors, qty. 500	100-257-02
BNC male RG59/HR crimp connectors, qty. 50	100-257-01

MHR mini high resolution cable	Part number
MHRHF-5/300 m halogen-free 1000'/300 m spool	22-126-03
MHRHF-5/150 m halogen-free 500'/150 m spool	22-126-02
MHR-5/1000 non-plenum 5-conductor 1000'/300 m spool	22-020-03
MHR-5/500 non-plenum 1-conductor 500'/150 m spool	22-020-02
MHR-5P/1000 plenum 5-conductor 1000'/300 m spool	22-103-03
MHR-5P/500 plenum 1-conductor 500'/150 m spool	22-103-02
BNC male mini HR crimp connectors, qty. 50	100-250-01

Terminated cable assemblies

RG6 super high resolution cable	Part number
RG6-5/25 non-plenum 5-conductor 25'/7.6 m	26-369-04
RG6-5/35 non-plenum 5-conductor 35'/10.6 m	26-369-12
RG6-5/50 non-plenum 5-conductor 50'/15.2 m	26-369-05
RG6-5/75 non-plenum 5-conductor 75'/22.8 m	26-369-06
RG6-5/100 non-plenum 5-conductor 100'/30.4 m	26-369-07
RG6-1/25 non-plenum 1-conductor 25'/7.6 m	26-383-04
RG6-1/35 non-plenum 1-conductor 35'/10.6 m	26-383-12
RG6-1/50 non-plenum 1-conductor 50'/15.2 m	26-383-05
RG6-1/75 non-plenum 1-conductor 75'/22.8 m	26-383-06
RG6-1/100 non-plenum 1-conductor 100'/30.4 m	26-383-07

MHR mini high resolution cable	Part number
MHR-5/25 non-plenum 5-conductor 25'/7.6 m	26-260-03
MHR-5/35 non-plenum 5-conductor 35'/10.6 m	26-260-17
MHR-5/50 non-plenum 5-conductor 50'/15.2 m	26-260-04
MHR-5/75 non-plenum 5-conductor 75'/22.8 m	26-260-16
MHR-5/100 non-plenum 5-conductor 100'/30.4 m	26-260-05
MHR-5P/25 plenum 5-conductor 25'/7.6 m	26-378-04
MHR-5P/35 plenum 5-conductor 35'/10.6 m	26-378-12
MHR-5P/50 plenum 5-conductor 50'/15.2 m	26-378-05
MHR-5P/75 plenum 5-conductor 75'/22.8 m	26-378-06
MHR-5P/100 plenum 5-conductor 100'/30.4 m	26-378-07

Removing and Installing Button Labels

Page B-15 provides strips of blank button labels. If desired, copy them or cut them out, write button information in each button area as desired, and put them in the switcher's input or output buttons' windows. You can also create labels using the Button Label Generator software (see chapter 5, "Matrix Software").

Installing labels in the matrix switcher's buttons

Install new labels in the matrix switcher's front panel buttons as follows:

1. Remove the button from the matrix switcher; use a small, flat bladed screwdriver such as an Extron Tweeker to gently pry a button out from the front panel (figure B-1).

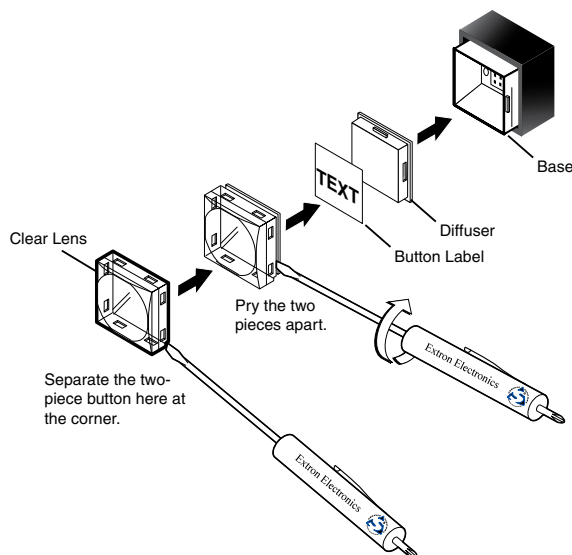
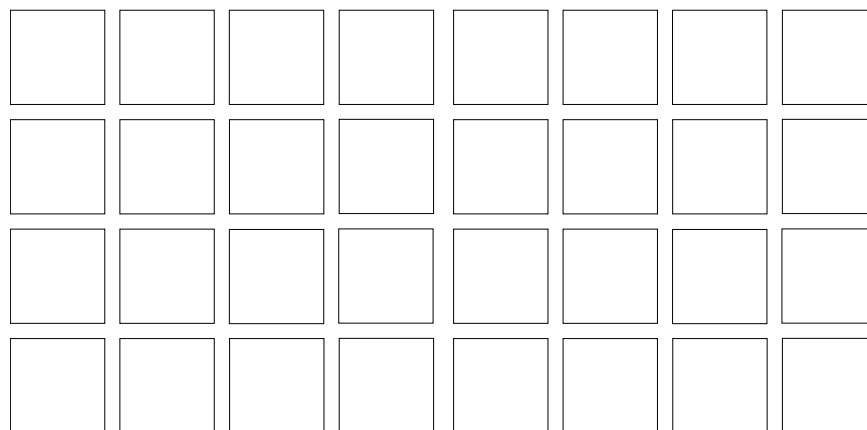
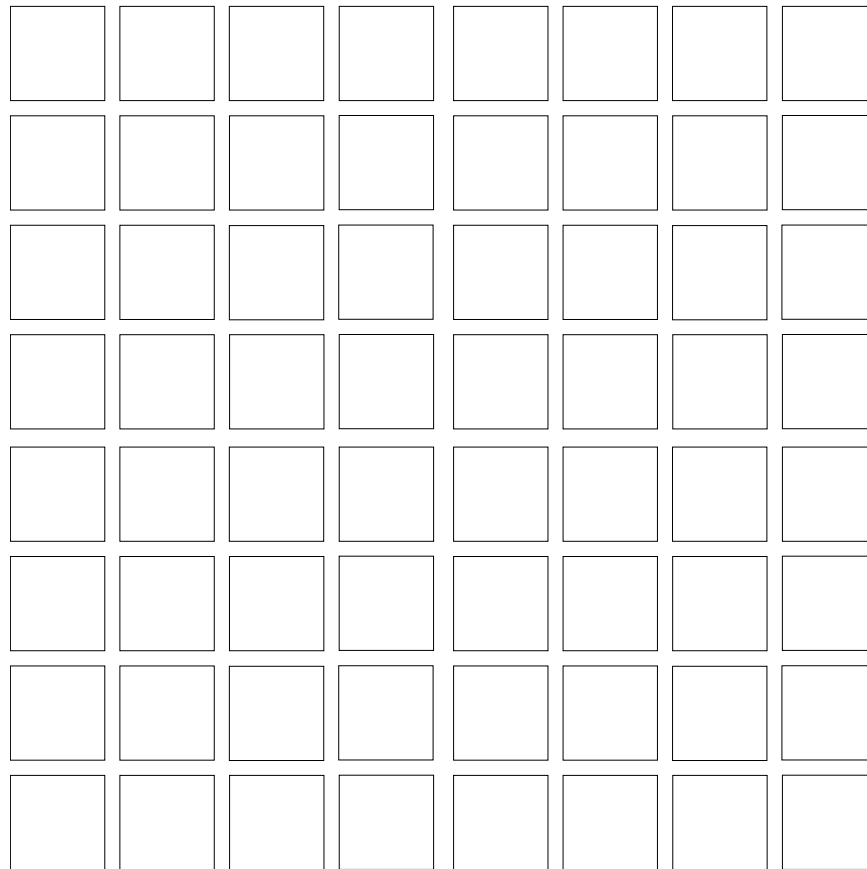
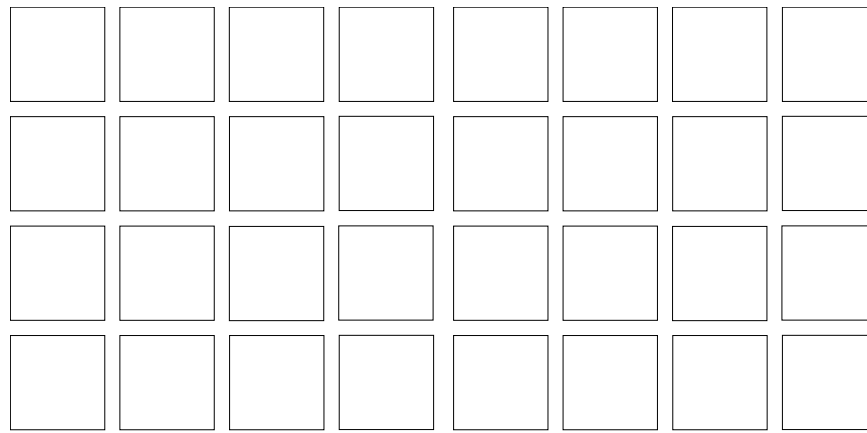


Figure B-1 — Illuminated button label replacement

2. Locate the notch in the corner of one side of the clear button cap lens.
3. Separate the white backing (diffuser) from the clear button cap (lens); insert the blade of the small screwdriver into the corner notch and gently twist the blade.
4. Save the translucent, white diffuser, but remove the text/label insert from the transparent button cap lens.
5. Insert the replacement button label into the button cap. Check for correct label orientation.
6. Align the white diffuser plate with the cap (lens). The bumps on the diffuser plate should be aligned (top and bottom) with the notches on the clear button cap. Firmly snap it into place.
7. Align the tabs on the matrix switcher's base with the notches on the diffuser plate. Gently, but firmly, press the reassembled button into place in the switcher's front panel.
8. Repeat steps 1 to 7 as needed to relabel other buttons.



Button label blanks

Reference Information, cont'd

Extron Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

**USA, Canada, South America,
and Central America:**

Extron Electronics
1001 East Ball Road
Anaheim, CA 92805
U.S.A.

Japan:

Extron Electronics, Japan
Kyodo Building, 16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

Europe, Africa, and the Middle East:

Extron Europe
Hanzeboulevard 10
3825 PH Amersfoort
The Netherlands

China:

Extron China
686 Ronghua Road
Songjiang District
Shanghai 201611
China

Asia:

Extron Asia
135 Joo Seng Road, #04-01
PM Industrial Bldg.
Singapore 368363
Singapore

Middle East:

Extron Middle East
Dubai Airport Free Zone
F12, PO Box 293666
United Arab Emirates, Dubai

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions or non-Extron authorized modification to the product.

If it has been determined that the product is defective, please call Extron and ask for an Applications Engineer at (714) 491-1500 (USA), 31.33.453.4040 (Europe), 65.383.4400 (Asia), or 81.3.3511.7655 (Japan) to receive an RA# (Return Authorization number). This will begin the repair process as quickly as possible.

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.

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